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REPORT OF PHASE II ENVIRONMENTAL SITE ASSESSMENT NS GREAT LAKES IL
12/14/2005
MACTEC ENGINEERING AND CONSULTING, INC

**REPORT OF PHASE II
ENVIRONMENTAL SITE ASSESSMENT
NAVSTA GREAT LAKES
NAVAL REGION MIDWEST FAMILY
HOUSING PRIVATIZATION**

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MACTEC Project No. 3205050441.01

December 14, 2005

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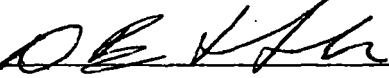
- Appendix A Representative Photographs
Appendix B Test Boring Records
Appendix C Analytical Laboratory Reports
Appendix D Interim Radiological Assessment Survey Report

Amendment

This Amendment is issued and effective as of January 1, 2006 for the purpose of amending, and a copy of this Amendment will be attached to and form an integral part of, each of those Reports which is listed on Exhibit "A" hereto by deleting the first paragraph which appears under the caption "Disclaimer and Limitation of Liability" in its entirety and replacing with the following provision:

This Report is intended for the exclusive use and benefit of Forest City Military Communities, LLC, Forest City Washington, Inc., Midwest Military Communities, LLC and Midwest Family Housing, LLC (collectively, "Client"). However, MACTEC has extended an offer to rely upon or use this Report ("Offer") to (i) the United States of America, Department of the Navy, and (ii) Lehman Brothers, Inc., its successors, affiliates, and permitted assigns, and is willing to extend an offer to reply upon or use this Report (also, "Offer") to the following third parties: (a) the authorized rating agency, (b) prospective bond or other security holders, (c) the trustees of a Trust created to hold the loan, or securities or certificates representing a participation or other interest therein, and (d) the loan servicer, as part of a securitized transaction, as third party beneficiaries of that certain contract between Client and MACTEC made as of July 5, 2005, as amended, (collectively, "Agreement") and this Report (all of the foregoing named in (i) through (d) above, inclusive, individually, "Beneficiary" and, collectively, "Beneficiaries"). The Offer has been, or hereby is, extended to each of you as a Beneficiary as if this Report was prepared for and addressed to you, which said Offer, and your ability to accept the Offer, are expressly conditioned upon (i) the limitations placed on the scope, nature and type of services performed by MACTEC under the Agreement, which are described in the Agreement and this Report, (collectively, "Services") and (ii) your agreement to be bound by the terms and conditions contained in the Agreement and this Report, all of which are incorporated herein by reference. Reliance upon or use of this Report and the contents hereof by you for any purpose whatsoever constitutes acceptance of the Offer and the foregoing conditions to such acceptance and makes you a third party beneficiary of the Agreement and this Report. A copy of the Agreement is available from MACTEC upon request, and certain substantive terms and conditions contained therein are attached to this Report as Attachment "A" for your information, in addition to a limitation of liability that MACTEC might incur as a result of the Agreement, the Services performed by MACTEC under the Agreement ("Services") and the Reports issued by MACTEC pursuant to the Agreement, including this Report ("Limitation of Liability"), as follows:

MACTEC Engineering and Consulting, Inc.

By 
Its Vice President

MACTEC Engineering and Consulting, Inc.

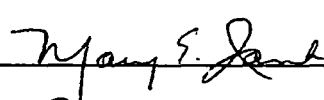
By 
Its Principal

EXHIBIT A

Property Condition Surveys:

Report of Property Condition Survey and Visual Infrastructure Inspection, Naval Region Midwest Family Housing Privatization, Fort Sheridan Naval Housing, August, 2005

Report of Property Condition Survey and Visual Infrastructure Inspection, Naval Region Midwest Family Housing Privatization, Forrestal Village Naval Housing, August, 2005

Report of Property Condition Survey and Visual Infrastructure Inspection, Naval Region Midwest Family Housing Privatization, Halsey and Nimitz Villages Naval Housing, August, 2005

Report of Property Condition Survey and Visual Infrastructure Inspection, Naval Region Midwest Family Housing Privatization, Glenview Naval Housing, August, 2005

Report of Property Condition Survey and Visual Infrastructure Inspection, Naval Region Midwest Family Housing Privatization, Naval Support Activity Crane, August, 2005

Phase I's:

Report of Phase I Environmental Site Assessment, Fort Sheridan, November 1, 2005

Report of Phase I Environmental Site Assessment, NAVSTA Great Lakes, October 31, 2005

Report of Phase I Environmental Site Assessment, Naval Support Activity Crane, November 11, 2005

Report of Phase I Environmental Site Assessment, Former Naval Air Station Glenview, October 31, 2005

Report of Phase I Environmental Site Assessment, NSGA Sabana Seca, December 5, 2005

Phase II's:

Report of Phase II Environmental Site Assessment, Fort Sheridan, December 14, 2005

Report of Phase II Environmental Site Assessment, NAVSTA Great Lakes, December 14, 2005

Report of Phase II Environmental Site Assessment, Naval Support Activity Crane, December 9, 2005

Report of Phase II Environmental Site Assessment, Former Naval Air Station Glenview, December 9, 2005

EXHIBIT "B"

Disclaimer and Limitation of Liability (To be included on 1st page of each Report)

This Report is intended for the exclusive use and benefit of Forest City Military Communities, LLC and Forest City Washington, Inc. (collectively, "Client"). However, MACTEC either has extended, or is willing to extend, an offer to rely upon or use this Report ("Offer") to (i) the United States of America, Department of the Navy, (ii) Lehman Brothers, Inc., its successors, affiliates, and permitted assigns, and (iii) the following third parties: (a) the authorized rating agency, (b) prospective bond or other security holders, (c) the trustees of a Trust created to hold the loan, or securities or certificates representing a participation or other interest therein, and (d) the loan servicer, as part of a securitized transaction, as third party beneficiaries of that certain contract between Client and MACTEC made as of July 5, 2005 ("Agreement") and this Report (individually, "Beneficiary" and, collectively, "Beneficiaries"). The Offer is extended to you as a Beneficiary as if this Report was prepared for and addressed to you, which said Offer, and your ability to accept the Offer, are expressly conditioned upon (i) the limitations placed on the scope, nature and type of services performed by MACTEC under the Agreement, which are described in the Agreement and this Report, (collectively, "Services") and (ii) your agreement to be bound by the terms and conditions contained in the Agreement and this Report, all of which are incorporated herein by reference. Reliance upon or use of this Report and the contents hereof by you for any purpose whatsoever constitutes acceptance of the Offer and the foregoing conditions to such acceptance and makes you a third party beneficiary of the Agreement and this Report. A copy of the Agreement is available from MACTEC upon request, and certain substantive terms and conditions contained therein are attached to this Report as Attachment "A" for your information, in addition to a limitation of liability that MACTEC might incur as a result of the Agreement, the Services performed by MACTEC under the Agreement ("Services") and the Reports issued by MACTEC pursuant to the Agreement, including this Report ("Limitation of Liability"), as follows:

A LIMITATION OF MACTEC'S LIABILITY WAS A MATERIAL CONSIDERATION FOR MACTEC'S WILLINGNESS TO PERFORM THE SERVICES. IN THOSE JURISDICTIONS WHERE REQUIRED, YOU HEREBY ACKNOWLEDGE THAT YOU HAVE RECEIVED SPECIAL CONSIDERATION OF TEN DOLLARS (\$10.00) AND WAIVE ANY AND ALL RIGHTS TO DISPUTE THE RECEIPT AND SUFFICIENCY THEREOF. TO THE MAXIMUM EXTENT PERMITTED BY LAW, CLIENT AND ALL BENEFICIARIES, INCLUDING YOU, EXPRESSLY AGREE, FOR THEMSELVES AND ANYONE CLAIMING BY, THROUGH OR UNDER THEM, THAT THE LIABILITY OF MACTEC, ITS PARENT, SUBSIDIARIES, AFFILIATES AND SUBCONTRACTORS, INCLUDING THEIR RESPECTIVE OFFICERS, DIRECTORS, EMPLOYEES, PRINCIPALS, PARTNERS, AGENTS, SUCCESSORS AND ASSIGNS, ("INDEMNITEES"), FOR ANY AND ALL CAUSES OF ACTION WHATSOEVER, INCLUDING, WITHOUT LIMITATION, TORT, CONTRACT, STRICT LIABILITY, INDEMNITY OR OTHERWISE, ARISING OUT OF, OR IN CONNECTION WITH, ANY PROFESSIONAL SERVICES PERFORMED, AND REPORTS ISSUED, PURSUANT TO THE AGREEMENT (BUT SPECIFICALLY EXCLUDING BODILY INJURY (INCLUDING DEATH), PROPERTY DAMAGE AND ANY OTHER CAUSES OF ACTION ARISING FROM SERVICES WHICH DO NOT INVOLVE THE EXERCISE OF PROFESSIONAL ENGINEERING OR ARCHITECTURAL EXPERTISE, DISCERNMENT, TRAINING OR JUDGMENT), SHALL BE LIMITED TO THE AGGREGATE SUM, INCLUDING AMOUNTS PAID TO CLIENT AND ANY AND ALL BENEFICIARIES, INCLUDING YOU, TO WHOM REPORTS ARE PROVIDED, ATTORNEYS' FEES AND ALL OTHER LITIGATION COSTS AND EXPENSES INCURRED BY MACTEC, IF ANY, OF ONE MILLION DOLLARS (\$1,000,000.00). CLIENT, IN ITS OWN RIGHT AND ON BEHALF OF THE BENEFICIARIES, INCLUDING YOU, TO WHOM IT INTENDED TO PROVIDE, AND IN FACT HAS PROVIDED OR WILL PROVIDE, ANY REPORT FOR RELIANCE, HAS ACKNOWLEDGED AND AGREED THAT (i) IT HAS HAD THE OPPORTUNITY TO NEGOTIATE THE TERMS OF THIS LIMITATION OF LIABILITY AND THAT THE LIMITATION OF LIABILITY AMOUNT MAY DIFFER FROM THE AMOUNT OF PROFESSIONAL LIABILITY INSURANCE REQUIRED OF MACTEC UNDER THE AGREEMENT, AND (ii) THE NEED FOR AND EXISTENCE, IF NOT THE PRECISE IDENTITY, OF THE BENEFICIARIES WAS FORESEEABLE AND KNOWN BY CLIENT.

Attachment "A" (To the Report)

STANDARD OF CARE. MACTEC will perform the Services in accordance with the Standard of Care. MACTEC will provide Client with a copy of the applicable ASTM standard(s) upon written request. Except where specified otherwise in MACTEC's proposal, a Phase I ESA and PCS will be a non-invasive survey of the Property that is the subject of the Services. **NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE OR INTENDED, AND THE SAME ARE SPECIFICALLY DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND THE OUTCOME OR RESULT OF ANY CASE OR PROJECT FOR WHICH CONSULTANT MAY BE RETAINED TO PROVIDE FORENSIC SERVICES AND/OR TESTIMONY.**

OFFER. Notwithstanding any other provision in this Agreement to the contrary, particularly including, but not limited to, Section 1.07 (a) above, Client acknowledges that the reports to be prepared by MACTEC as a result of the Services performed by it under this Agreement (individually, "Report" and, collectively, "Reports") are intended for the exclusive use and benefit of, and may be relied upon only by, (i) Client, (ii) Lehman Brothers, Inc., its successors, affiliates, and permitted assigns, and (iii) the following third parties: (a) the authorized rating agency, (b) prospective bond or other security holders, (c) the trustees of a trust created to hold the loan, or securities or certificates representing a participation or other interest therein, and (iv) the loan servicer, as part of a securitized transaction. Those parties named in (ii) through (iii) above hereby are specifically made third party beneficiaries of this Agreement and the Reports (individually, "Beneficiary" and, collectively, "Beneficiaries"). In furtherance of the foregoing, MACTEC hereby offers reliance upon and use of the Reports, as aforesaid, to each Beneficiary ("Offer"). Each Beneficiary may accept the Offer by receiving a copy of, and relying upon or otherwise using, a Report.

ACCEPTANCE OF OFFER. Owner, Consultant and each Beneficiary agree that receipt, reliance upon or use of the Reports and the contents thereof by a third party for any purpose whatsoever constitutes acceptance of the Offer and the foregoing conditions to such acceptance, and makes that third party a third party Beneficiary of this Agreement and the Reports. Reliance upon or use of the Reports for any purpose whatsoever by an individual or entity which is neither a party to this Agreement, nor a Beneficiary, is entirely at the peril of that individual or entity. Owner and Beneficiaries further acknowledge and agree that the contents of each Report will only reflect MACTEC's findings as to the conditions that existed at the time the Services referenced therein were performed and may be based in part or in whole on facts and/or assumptions provided to, but not verified independently by, MACTEC, and that MACTEC makes no representations or warranties as to the condition of the subject of any Report subsequent to the date on which the applicable Services were performed or with respect to any facts and/or assumptions provided to, but not verified independently by, MACTEC.

INDIRECT DAMAGES. Neither MACTEC nor you shall be responsible to the other party or any third party for any indirect or incidental damages (including, but not limited to, loss of use, income, profits, financing or reputation) arising out of or relating to the Agreement, this Report or the performance of the Services that gave rise to this Report.

NOTICE REGARDING ASSUMPTION OF RISK AND ADDITIONAL SERVICES OPTIONS. Since a Phase I ESA and a PCS is a survey and not an invasive investigation, and a Phase II ESA is a minimally invasive investigation that utilizes commonly used exploration methods (e.g. drilling, subsurface sampling) to take groundwater, soil and other Samples only in limited areas where the presence of contaminants is suspected, Client understands there is a risk that (i) certain past and present conditions, latent and otherwise, might not be detected and reported by MACTEC and (ii) contamination of previously uncontaminated soils and/or water, including water-bearing strata, which are capable of spreading Contaminants off-site, as well as on-site, might occur even if the Services are performed in accordance with the Standard of Care which is applicable to the Services. Such conditions include, but are not limited to, the presence of UST's that may have been installed and/or removed prior to performing a Phase I or Phase II ESA, short-term uses (generally less than 10 years) that may not be reflected in aerial photographs or other information that is readily available at the time a Phase I ESA is performed, the presence of contamination in areas where it was not suspected at the time a Phase II is performed, or conditions in roofs, buildings and other structures, and various components thereof, that, given the

non-invasive nature of the Services and/or limited visibility or accessibility, are not readily observable at the time a PCS is performed.

Client understands that a PCS is normally performed by a person who possesses a general knowledge of multiple building systems, but is not a specialist in any one of those systems. If Client wishes to have one or more systems surveyed by more experienced personnel, Client has the option to request MACTEC to perform a more extensive PCS, as additional Services, with a corresponding increase in compensation being payable to MACTEC. Also, a façade, invasive, and other special inspection(s) can be performed for roofs, buildings and other structures, and various components thereof, in lieu of a visual survey as additional Services, with a corresponding increase in compensation being payable to MACTEC. If Client does not request such additional Services, Client agrees that MACTEC is in no way liable for any Claims or Liabilities for a condition(s) which such additional Services might have detected. Client agrees that MACTEC is not an insurer or guarantor of the property that is the subject of the Services or the value thereof.

DAMAGES. In the event that MACTEC fails to perform in accordance with the Standard of Care which is applicable to the Services, Client agrees that the damages for which MACTEC shall be liable shall be limited to that proportion of damages which is attributable to MACTEC's percentage of fault which, in no event, shall exceed the limitation of liability set forth in Section 1.07 (c) of the Agreement. Further, in the event that MACTEC fails, in either an ESA or a PCS, to correctly report an environmental or deficient condition in violation of the applicable Standard of Care, the liability of MACTEC, and Client's exclusive remedy, for any and all damages which result therefrom is limited to the lesser of (i) the cost to either remedy the deficient condition or (ii) the resultant diminution in value of the Property on which the ESA was performed that is actually realized by Client, but in no event shall MACTEC be liable for the entire cost of replacing the Property or portion thereof that is subject to the deficient condition; provided, in the event that MACTEC has performed a PCS in violation of the applicable Standard of Care and the Property or portion thereof that is subject to the deficient condition cannot be remedied for a reasonable cost, but must be replaced prior to the end of its useful life, as its useful life was represented by MACTEC, the aforesaid liability of MACTEC will be limited to the value of the useful life of the Property or portion thereof for which Client did not receive the benefit of its represented useful life. This value shall be an amount equal to the full replacement cost of that Property or portion thereof, if and when replaced, multiplied by a fraction, the numerator of which is the amount of said useful life which was lost by the premature replacement and the denominator of which is the useful life, as represented by MACTEC, of the replaced Property or portion thereof that was ended prematurely.

EXECUTIVE SUMMARY

MACTEC Engineering and Consulting, Inc. (MACTEC) was contracted by Forest City Washington (Forest City) to perform a Phase II Environmental Site Assessment (ESA) at residential portions of the NAVSTA Great Lakes facility in Great Lakes, Illinois (subject property). This *Phase II Environmental Site Assessment Report* documents the activities performed during the Phase II ESA and presents findings and conclusions with regard to environmental impacts at the site.

The NAVSTA Great Lakes facility totals more than 1,600 acres of land. The portion of NAVSTA Great Lakes which comprises the subject property consists of residential housing units at Forrestal Village, Mainside including Squirrel Hollow and Brick Row, Hospital Cove including Fishbowl, Nimitz Village, and Halsey Village. The NAVSTA Great Lakes has been in operation since 1911 to support naval training including the Corp School, the Recruit Training Command, and the Training Support Center.

The purpose of the Phase II ESA was to determine potential environmental impacts to the subject property from conditions identified during document review and a Phase I Environmental Site Assessment (Phase I ESA) performed by MACTEC. The scope of work performed for this Phase II ESA is based on the findings of document review performed by MACTEC prior to the Phase I ESA. As part of the document review, it was determined that Phase II ESA activities were not warranted in the Nimitz Village or Halsey Village neighborhoods. Therefore, the Nimitz Village and Halsey Village neighborhoods will generally not be discussed in this report. The document review indicated that Phase II ESA activities were warranted at Forrestal Village, Mainside, and Hospital Cove. No additional areas of concern were identified during completion of the Phase I ESA.

Onsite Phase II ESA activities began on June 21, 2005 and were completed on September 8, 2005. The areas investigated during the Phase II ESA included the following areas at Forrestal Village:

- Onsite Leaking Underground Storage Tank (LUST) at Building 2710 (Citgo Station)
- Offsite LUST Incident, Building 3216
- Offsite LUST Incident, Building 3511
- Onsite UST at 3134 Montana Ave
- IR Site No. 2 - Forrestal Village Landfill (Onsite)
- IR Site No. 3 - Supplyside Landfill (Offsite)
- IR Site No. 18 - Monazite Sand Area (Offsite)
- IR Site No. 20 - Radium-contaminated Soil Area (Offsite)
- Lead-contaminated surficial soil at Onsite Buildings 3028G, 3156D, and 3160D

In addition, the Phase II ESA activities included sampling of lead-contaminated surficial soil at Quarters D, I, K, and 64 at Mainside and Buildings 202H, 204H, and 209H at Hospital Cove.

Also, during the Phase I ESA, MACTEC reviewed radon testing results which indicated that elevated radon levels were detected in residential units located at Forrestal Village, Nimitz Village, Mainside, and Hospital Cove. No additional radon testing was performed during the Phase II ESA. Additional radon sampling and necessary mitigation will be addressed during development activities.

Furthermore, during the Phase I ESA, the Navy verbally indicated to MACTEC that the Navy has encountered transite and other asbestos-containing materials (ACM) in topsoil at various locations within Nimitz Village, Halsey Village, and within the Forrestal Village landfill soil cap. More recently, the

Navy verbally indicated to MACTEC that ACM in the topsoil has been encountered at various locations within Forrestal Village. No soil samples were collected and analyzed for ACM during the Phase II ESA.

Phase II ESA activities consisted primarily of soil sample collection and analysis of chemical contaminants known or suspected to be present at the various locations, but also included collection of a groundwater sample, installation of landfill methane gas vents and methane monitoring, and performance of a radiological survey. Selection of sample analytical parameters was based upon review of documents related to previous environmental activities at the sites.

Based upon the analytical testing of soil samples collected at **Forrestal Village** during the Phase II ESA, and comparison of the testing results to TACO Tier 1 soil remediation objectives for residential property use and for construction workers, MACTEC has drawn the following conclusions and recommendations regarding the subsurface environmental conditions at the subject property:

- Onsite LUST at Building 2710 (Citgo Station): While the LUST site at Building 2710 (Citgo Station) is within the boundary of the subject property, MACTEC understands that the site will not be part of the transaction. BTEX and MTBE concentrations in soil samples and one (1) groundwater sample collected along the west side of Meridian Drive across from the UST site at Building 2710 (Citgo Station) were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, MACTEC concludes that the LUST site at Building 2710 (Citgo Station) has not affected the subject property and MACTEC does not recommend any further activity for this location. However, MACTEC recommends that continued remediation and monitoring of the LUST site as performed by the Navy be monitored by Forest City.
- Offsite LUST Incident, Building 3216: One (1) soil sample collected in shallow soil at the former dispenser island at the offsite LUST incident at Building 3216 exhibited residual contaminant concentrations above TACO Tier 1 soil remediation objectives for residential property use and for construction workers. In this sample, the benzene concentration exceeded the TACO Tier 1 residential soil remediation objectives for the inhalation pathway, the soil component of groundwater exposure route for sites with Class I and Class II groundwater, and the industrial/commercial objectives for the inhalation pathway for construction workers. In addition, the naphthalene in this sample exceeded the Tier 1 industrial/commercial soil remediation objectives for inhalation pathway for construction workers and the carbazole concentration exceeded the TACO Tier 1 soil remediation objectives for the soil component of groundwater exposure route for sites with Class I groundwater. Therefore, offsite soil has been impacted by this LUST Incident. MACTEC also collected soil samples on the subject property. Shallow soil samples collected on the east side of Mississippi Street across from the offsite LUST incident at Building 3216 were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, MACTEC concludes that the offsite LUST incident at Building 3216 has not affected the subject property and MACTEC does not recommend any further action at this location.
- Offsite LUST Incident, Building 3511: PNA concentrations in soil samples collected along the east side of Mississippi Street across from the offsite LUST incident at Building 3511 were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, MACTEC concludes that the offsite LUST incident at Building 3511 has not affected the subject property and MACTEC does not recommend any further action at this location.

- Onsite UST at 3134 Montana Ave: BTEX and PNA concentrations in soil samples collected the suspected heating oil UST at 3134 Montana Ave were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, it appears that this UST and the petroleum product it may have contained have not affected the subject property.

The Navy reported that this UST has been removed and that no release from the UST was observed. However, the Navy also reported that approximately 200 gallons of product were released from storage in an aboveground storage tank, pending disposal by the tank removal contractor, during the removal activities. The Navy indicated that the tank removal contractor will clean up the spill and collect confirmatory samples. MACTEC recommends that those sample results be requested and evaluated by Forest City to verify that this spilled area has been adequately remediated. Otherwise, MACTEC does not recommend any further action at this location.

- IR Site 2 - Forrestal Village Landfill (Onsite): Methane was detected in one (1) of the twenty (20) soil-gas vents installed around the onsite Forrestal Village Landfill. The soil-gas vent in which methane was detected, GV-16, is adjacent to the southwest corner of the landfill. Previous methane testing conducted by the Navy also indicated a subsurface methane detection at the northwest corner of the Forrestal Village Landfill near the residential building 4228. Based upon the methane testing data as collected by the Navy and MACTEC, MACTEC concludes that methane from the Forrestal Village Landfill may potentially affect the subject property.

The Navy's regional Environmental Manager has verbally indicated that a passive methane venting system is in place and will be upgraded by the Navy who plans also to install a new surficial soil cap over the landfill cap at the Forrestal Village Landfill. MACTEC recommends that Forrest City monitor the upgrades to the passive venting system and installation of the landfill cap. Otherwise, no further action at this location is recommended at this time. Because the recently detected methane (in GV-16) is on the south side of the Forrestal Village Landfill which will be at some distance from the newly constructed housing units, and based on the information provided by the Navy indicating that it is planning to upgrade the existing passive venting system to capture methane produced on the south side of the landfill, MACTEC does not believe the methane detected presents a risk to future housing occupants.

- IR Site 3 - Supplyside Landfill (Offsite): Supplyside Landfill is located offsite, west of the boundary of the subject property. Methane was not detected in the five (5) gas vents installed onsite, east of the Skokie Ditch, and east of the offsite Supplyside Landfill. Therefore, MACTEC concludes that methane from the Supplyside Landfill, if any has been produced, has not affected the subject property and MACTEC does not recommend any further activity for this location.

IR Sites 18 & 20 – Monazite Sand & Radium-Contaminated Soil Areas: A former monazite sand storage area and an area of radium contaminated soil are present on Supplyside, near Buildings 3214 and 3215. Although this site is west of the boundary of the subject property, the proximity of this site to the proposed housing units warranted Phase II ESA investigation activities. MACTEC conducted a preliminary radiation screening survey east of these areas. Due to elevated radiation levels that were detected during the preliminary screening, MACTEC determined that a more thorough radiological survey of the area designed and performed by health physicists was warranted. MACTEC health physicists performed the additional radiological survey in September 2005. The elevated concentrations of thorium in the soil raised a concern that such concentrations might be more widespread. The deposition mechanism for these materials appeared to be from the use of Monazite sands as fill material and not through natural

environmental transport processes. Therefore, Forest City authorized MACTEC to perform an additional radiological survey in areas within and immediately north, south, and east of the previously identified impacted locations. The survey included a walk-over survey to measure gross gamma radiation readings and collection of near-surface soil and slag/rock samples for laboratory radiological analysis from several locations at which elevated gamma readings were identified. The survey and laboratory analysis confirmed the locations of the previous impacted areas and identified additional locations where elevated gamma levels were detected. Soil sample results indicated thorium levels which exceeded screening levels to which they were compared. The locations identified with elevated gamma readings and sample results above screening levels will be excluded from the Naval property leased to the joint venture. The Navy's regional Environmental Manager has verbally indicated that the Navy will remediate the locations identified with elevated radiological levels. Once these areas are remediated, they will be released to become part of the Naval property leased to the joint venture. MACTEC understands that the Navy will fence off the areas of Forrestal Village where greater-than-background concentrations of radioactive material have been detected to preclude easy personnel access. As with most types and concentrations of radioactive material, humans must come in contact with, and/or close proximity to, the material to have a significant health risk posed by the material. So long as the subject areas remain fenced to preclude easy access, and assuming that the material is not spread outside of the fenced areas by wind or water runoff, MACTEC believes that the radioactive material inside of the fenced areas poses little health risk to nearby residents and workers.

- Buildings 3028G, 3156D, and 3160D: Surficial soil samples collected immediately adjacent to onsite Buildings 3028G, 3156D, and 3160D did not exhibit lead concentrations above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Since previous sampling conducted by the Navy indicated lead concentrations which were above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers at these locations, and the exact locations of these previous samples were not reported, MACTEC cannot make any definite conclusions regarding the lead concentrations in these surficial soil locations. Consequently, MACTEC recommends that gridded sampling be conducted to verify that lead concentrations at these locations are below the TACO Tier 1 residential soil remediation objectives. Current plans are for the gridded sampling to be performed by MACTEC as part of the site development activities. In the event that the gridded sampling indicates the presence of lead-contaminated soils, the current plan is for the soil to be remediated by excavation and offsite disposal by the demolition contractor as part of site development activities.

Based upon the analytical testing of soil samples collected at **Mainside** during the Phase II ESA, and comparison of the testing results to TACO Tier 1 soil remediation objectives for residential property use and for construction workers from exposure, MACTEC has drawn the following conclusions and recommendations regarding the subsurface environmental conditions at the subject property:

- Quarters D, K, I, and Building 64 at Mainside: Of the sixteen (16) surficial soil samples collected immediately adjacent to Quarters D, K, I, and 64, fifteen (15) exhibited total lead concentrations above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Four (4) of the fifteen (15) samples with elevated total lead concentrations were also tested for toxicity characteristic leaching procedure (TCLP) lead. All four (4) TCLP lead results were above the TACO Tier 1 soil to groundwater component remediation objective for sites with Class I groundwater. Two (2) of the four (4) TCLP lead values were above the USEPA toxicity characteristic criteria level indicating that this soil could be classified as hazardous waste. Based upon the age of these buildings, the source of these elevated lead

concentrations is probably lead-based paint used on the exterior surfaces of these structures. Therefore, MACTEC concludes that lead-based paint used on these buildings has affected the subject property.

MACTEC recommends remediation to remove the lead-contaminated soils at these locations. Based upon the TCLP lead results, this soil may have to be handled and disposed of as hazardous waste. In lieu of soil remediation, TACO regulations allow for the installation and maintenance of an engineered barrier (3 feet of clean soil or asphalt or concrete cover) over the affected areas and construction worker caution should construction workers be working in the area and be potentially exposed to the impacted soil. Further, unless these buildings will be demolished, MACTEC recommends abatement or encapsulation of any remaining lead-based paint on the structures. Current plans are for the remediation by excavation and offsite disposal of the lead-contaminated soils at these locations by the demolition contractor as part of site development activities.

Based upon the analytical testing of soil samples collected at **Hospital Cove** during the Phase II ESA, and comparison of the testing results to TACO Tier 1 soil remediation objectives for residential property use and for construction workers from exposure, MACTEC has drawn the following conclusions and recommendations regarding the subsurface environmental conditions at the subject property:

- **Buildings 202H, 204H, and 209H at Hospital Cove:** Of the seven (7) surficial soil samples collected immediately adjacent to Quarters 202H, 204H, and 209, six (6) exhibited total lead concentrations above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers. One (1) of the six (6) samples with elevated total lead concentrations was also tested for TCLP lead. The TCLP lead result was above the TACO Tier 1 soil to groundwater component remediation objective for sites with Class I groundwater and above the USEPA toxicity characteristic criteria level indicating that this soil could be classified as hazardous waste. Based upon the age of these buildings, the source of these elevated lead concentrations is probably lead-based paint used on the exterior surfaces of these structures. Therefore, MACTEC concludes that lead-based paint used on these buildings has affected the subject property.

MACTEC recommends remediation to remove the lead-contaminated soils at these locations. Based upon the TCLP lead results, this soil may have to be handled and disposed of as hazardous waste. In lieu of soil remediation, TACO regulations would require the installation and maintenance of an engineered barrier (3 feet of clean soil or asphalt or concrete cover) over the affected areas and construction worker caution should construction workers be working in the area and be potentially exposed to the impacted soil. Further, unless these buildings will be demolished, MACTEC recommends abatement or encapsulation of any remaining lead-based paint on the structures. Current plans are for the remediation by excavation and offsite disposal of the lead-contaminated soils at these locations by the demolition contractor as part of site development activities.

1.0 INTRODUCTION

MACTEC Engineering and Consulting, Inc. (MACTEC) was contracted by Forest City Washington (Forest City) to perform a Phase II Environmental Site Assessment (ESA) at residential portions of the NAVSTA Great Lakes facility in Great Lakes, Illinois (subject property). Figure 1 shows the site location. This *Phase II Environmental Site Assessment Report* documents the activities performed during the Phase II ESA and presents findings and conclusions with regard to environmental impacts at the site.

1.1 Purpose and Scope

The NAVSTA Great Lakes facility totals more than 1,600 acres of land. The portion of NAVSTA Great Lakes which comprises the subject property consists of residential housing units at Forrestal Village, Mainside including Squirrel Hollow and Brick Row, Hospital Cove including Fishbowl, Nimitz Village, and Halsey Village. The NAVSTA Great Lakes has been in operation since 1911 to support naval training including the Corp School, the Recruit Training Command, and the Training Support Center.

The purpose of the Phase II ESA was to determine potential environmental impacts to the subject property from conditions identified during document review and a Phase I Environmental Site Assessment (Phase I ESA) performed by MACTEC (see *Report Of Phase I Environmental Site Assessment, NAVSTA Great Lakes, Naval Region Midwest Family Housing Privatization*, dated October 31, 2005, prepared by MACTEC). The scope of work performed for this Phase II ESA is based on the findings of document review performed by MACTEC prior to the Phase I ESA. As part of the document review, it was determined that Phase II ESA activities were not warranted in the Nimitz Village or Halsey Village neighborhoods. Therefore, the Nimitz Village and Halsey Village neighborhoods will not be discussed in this report. The document review indicated that Phase II ESA activities were warranted at Forrestal Village, Mainside, and Hospital Cove. No additional areas of concern were identified during completion of the Phase ESA.

Onsite Phase II ESA activities began on June 21, 2005 and were completed on September 8, 2005. The areas investigated during the Phase II ESA included the following areas at Forrestal Village:

- Onsite Leaking Underground Storage Tank (LUST) at Building 2710 (Citgo Station)
- Offsite LUST Incident, Building 3216
- Offsite LUST Incident, Building 3511
- Onsite UST at 3134 Montana Ave
- IR Site No. 2 - Forrestal Village Landfill (Onsite)
- IR Site No. 3 - Supplyside Landfill (Offsite)
- IR Site No. 18 - Monzanite Sand Area (Offsite)
- IR Site No. 20 - Radium-contaminated Soil Area (Offsite)
- Lead-contaminated surficial soil at Onsite Buildings 3028G, 3156D, and 3160D

In addition, the Phase II ESA activities included sampling of lead-contaminated surficial soil at Quarters D, I, K, and Building 64 at Mainside and Buildings 202H, 204H, and 209H at Hospital Cove.

Also, during the Phase I ESA, MACTEC reviewed radon testing results which indicated that elevated radon levels were detected in residential units located at Forrestal Village, Nimitz Village, Mainside, and Hospital Cove. No additional radon testing was performed during the Phase II ESA. Furthermore, during the Phase I ESA, the Navy verbally indicated to MACTEC that the Navy has encountered transite and other asbestos-containing materials (ACM) in topsoil at various locations within Nimitz Village, Halsey

Village, and within the Forrestal Village landfill soil cap. More recently, the Navy verbally indicated to MACTEC that ACM in the topsoil has been encountered at various locations within Forrestal Village. No soil samples were collected and analyzed for ACM during the Phase II ESA.

Phase II ESA activities consisted primarily of soil sample collection and analysis of chemical contaminants known or suspected to be present at the various locations, but also included collection of a groundwater sample, installation of landfill methane gas vents and methane monitoring and performance of a radiological survey. Selection of sample analytical parameters was based upon review of documents related to previous environmental activities at the sites. Analytical results are summarized on tables and sample locations and gas vent locations are shown on figures included herein. Supporting documentation is included in Appendices as necessary.

1.2 Report Organization

The locations of the investigation areas are shown on Figure 2 and Figure 3. Table 1 summarizes the scope of the Phase II ESA conducted at each site. Section 2.0 of this report represents a brief description of the background of the investigation areas and previous results based upon review of available documents. The field investigation procedures are described in Section 3.0. Section 4.0 contains a summary of the analytical results. Conclusions and Recommendations based on these results are presented in Sections 5.0 and 6.0, respectively. Section 7.0 contains a list of references used in the preparation of this report.

2.0 BACKGROUND

To focus MACTEC's Phase II ESA on those portions of the subject property where the potential for environmental impacts exists, MACTEC performed a preliminary review of existing environmental documents related to the subject property. The purpose of the document review was to identify onsite or offsite areas of environmental concern. Based on MACTEC's document review, a description of the portions of the subject property which warranted further investigation are described in the following sections.

2.1 Forrestal Village

The following sites within the Forrestal Village portion of the subject property were identified for Phase II ESA activities:

2.1.1 Onsite LUST at Building 2710 (Citgo Station)

While the LUST site at Building 2710 (Citgo Station) is within the boundary of the subject property, MACTEC understands that the site will not be part of the transaction. This site is currently an active gasoline filling station and convenience store with USTs which are currently operating and is located in the east central portion of Forrestal Village directly across Meridian Drive from housing units. The proximity of this LUST site to housing units warranted Phase II ESA investigation activities.

Apparent leakage of the former UST systems at this location resulted in extensive contamination of soil and groundwater with the gasoline indicator parameters benzene, toluene, ethylbenzene, and xylenes and methyl tertiary butyl ether (MTBE) above TACO Tier 1 objectives. During removal of previous UST systems at the site in 1995, the Navy excavated and disposed offsite approximately 2,235 cubic yards of tank backfill and native soils. Apparently, excavation of contaminated soils was not performed beyond the sidewalk along the western edge of this site. In the *Corrective Action Plan, Naval Training Center Bldg. 2710, Great Lakes, Illinois*, dated October 2, 1998, prepared by Beling Consultants, the Navy acknowledged that "... residual petroleum contamination may eventually migrate 200 feet or more from the source if not treated or managed." The CAP showed the extent of soil contamination as at the eastern edge of the north-bound lane of Meridian Drive, located west of the site. Likewise, the extent of groundwater contamination was shown to extent to the median in Meridian Drive. Therefore, the CAP proposed in-situ bioremediation injections with a closed-loop groundwater recovery system to provide hydraulic control of the contaminated plume. According to the *Ninth Quarterly Monitoring Report, Building 2710 (NEX Mini-Mart) Naval Station, Great Lakes, Illinois*, dated August 9, 2004, prepared by TolTest, Inc. (the most recent document available for review), the remediation system has been operating since February 2002. According to periodic groundwater sampling results reported in the Ninth Quarterly Report, the extent of groundwater contamination remains at the median in Meridian Drive. It is unclear whether soil or groundwater sampling was ever conducted west of the median along the eastern side of the housing area.

2.1.2 Offsite LUST Site, Building 3216

The LUST site at Building 3216 is located on the west side of Mississippi Street in the northwest corner of Forrestal Village. However, this site is west of the boundary of the subject property. The proximity of this offsite LUST site to housing units warranted Phase II ESA investigation activities.

According to the *Final Underground Storage Tank Closure Report, Building 3216, Naval Station, Great Lakes, Illinois*, dated October 6, 2003, prepared by TolTest, Inc., one (1) 4,000-gallon gasoline UST and one (1) 4,000-gallon diesel UST were removed in July 2003. The USTs were located within a grassy area north of Building 3216 and were connected to product dispensers located within 25 to 30 feet south of the

USTs. Upon removal of the USTs, piping, and product dispensers, it was determined that a release had not occurred, therefore, an incident was not reported to the Illinois Emergency Management Agency. Soil samples were collected from the tank and piping excavations and were tested for BTEX, semi-volatile organic compounds (semi-VOCs), total lead and toxicity characteristic leaching procedure (TCLP) lead. The results indicated that one (1) soil sample collected from the tank excavation exhibited TCLP lead above the TACO Tier 1 remediation objective for the soil to groundwater component for sites with Class I groundwater. Both samples collected below the product dispensers exhibited benzene above its TACO Tier 1 residential soil remediation objective and one (1) sample collected below the gasoline dispenser exhibited 2,4-dinitrotoluene above its TACO Tier 1 residential soil remediation objective. All other concentrations of detected contaminants were below TACO Tier 1 residential soil remediation objectives. Documentation of additional remediation at these locations was not discovered during the document review process.

2.1.3 Offsite LUST Site, Building 3511

The LUST site at Building 3511 is located on the west side of Mississippi Street in the central portion of Forrestal Village. However, this site is west of the boundary of the subject property. The proximity of this offsite LUST site to housing units warranted Phase II ESA investigation activities.

According to the *Final Delivery Order Closure Report, Leaking Underground Storage Tank Relative Risk Ranking Sampling 18 Sites, Great Lakes Naval Training Center, Illinois*, dated April 2003 (Final Closure Report), prepared by TolTest, Inc., one (1) 4,000-gallon and two (2) 20,000-gallon diesel USTs were removed in November 1994. No soil or groundwater samples were collected and the petroleum-impacted tank cavity was backfilled with clean fill material. IEPA-required LUST program documentation was reportedly not submitted. Follow-up soil and groundwater samples were collected from this LUST site as part of activities associated with the Final Closure Report. All samples were analyzed for BTEX and polynuclear aromatic hydrocarbons (PNAs). The Final Closure Report indicated that several PNAs were detected in soil to 10 feet below ground surface (bgs) above their respective TACO Tier 1 residential soil remediation objectives. Likewise, several PNAs in groundwater exceeded their TACO Tier 1 groundwater remediation objectives for sites with Class I groundwater and one (1) PNA also exceeded its TACO Tier 1 groundwater remediation objectives for sites with Class II groundwater. Documentation of remediation at these locations was not discovered during the document review process.

2.1.4 Onsite UST at 3134 Montana Ave

Navy personnel verbally indicated that a UST had recently been discovered at this vacant site. This site is within the boundary of the subject property. The Navy surmised that this tank may have been a heating oil UST associated with a former farmhouse in this location prior to development of Forrestal Village as Navy housing. No documentation of sampling to determine the potential impact of this UST on the subject property was discovered during the document review process.

2.1.5 IR Site 2 - Forrestal Village Landfill

The Forrestal Village Landfill (also known as the Playground Landfill) located south of Virginia Street, east of Superior Street, west of the creek (Skokie Ditch), within the boundary of the subject property in the west central portion of Forrestal Village. The previous findings and proximity of the landfill area to existing housing units warranted Phase II ESA investigation activities.

According to the *Final Delivery Order Completion Report, Forrestal Landfill Boundary Delineation (IR Site 2), Demolition Debris Disposal Area (IR Site 13G), Naval Training Center, Great Lakes, Illinois*, dated September 2000 and *Final Delivery Order Completion Report, Sampling and Analytical Testing of Volatile Organic Compounds at Forrestal Landfill Naval Training Center (NTC), Great Lakes, Illinois*,

dated April 2003, both prepared by TolTest, Inc., Forrestal Village Landfill covers an estimated area of approximately 75,000 square feet. The landfill was reportedly used to deposit sanitary wastes for a period of time in the mid 1960s. MACTEC's Phase I ESA indicates that the Forrestal Village Landfill was operated as a trench-type landfill with no burning. No hazardous wastes were reported disposed in this landfill. It contains approximately 76,000 cubic yards of refuse. Transite (asbestos-containing material (ACM)) waste has been reported in the topsoil used for the landfill cover by the Navy.

The Toltest reports indicated that soil borings conducted in the landfill area delineated the extent of landfill waste material. Further, soil gas samples were collected in the vicinity of those that encountered waste materials and were analyzed for volatile organic compounds (VOCs) at a laboratory. Low levels of VOCs including BTEX compounds, trichloroethene (TCE), and methylene chloride were detected in the soil gas samples. None of the VOCs were detected above a concentration of 10 ug/L. In addition, Toltest conducted in-situ screening for methane, oxygen, and carbon dioxide with a hand-held landfill gas meter in the same soil borings as those from which soil gas samples were collected. Methane readings ranged from 0 to 5% in locations along the east side, in the northeastern and southwestern corners and at one (1) location along the western edge of the landfill area. Within the central portion of the landfill, however, methane readings were detected ranging from 54.5% to 61.8%, including one (1) location in the northwestern corner of the landfill area near residential building 4228 in which the methane reading was 51.8%. Based upon these elevated methane readings, Toltest recommended the installation of a landfill gas management system at Forrestal Village Landfill.

Subsequent to the Toltest evaluation of the Forrestal Village Landfill, Clayton Group Services, Inc. (Clayton) was retained by the Navy to provide engineering analysis of the existing soil cap and recommend design improvements. A report entitled *Project Plans and Report, Final Cover Study, Forrestal Landfill, Great Lakes, Illinois*, dated May 5, 2004, prepared by Clayton indicated that soil borings conducted as part of this engineering analysis generally confirmed Toltest's delineation of the waste extents. In addition, in-field methane monitoring conducted by Clayton within three (3) piezometers installed in the central portion of the landfill generally confirmed the presence of elevated methane readings that ranged from 21.9% to 53.6%. Given the Navy's desired end use of the site as light recreational use, Clayton recommended the installation of a low permeability cap with a passive landfill gas capture and venting system below the cap and improved surface drainage and landscaping features to maintain the integrity of the cap. It is MACTEC's understanding that the Navy has installed the passive methane venting system and landfill cap as proposed by Clayton. However, because the topsoil used for the cap reportedly may contain transite, an asbestos containing material, it is MACTEC's understanding that a new surficial soil cap will be installed by the Navy.

2.1.6 IR Site 3 - Supplside Landfill

The Supplside Landfill is located south and west of Superior Street in the southwest corner of Forrestal Village. This site is offsite and west of the boundary of the subject property. The previous findings and proximity of the landfill area to potentially new housing warranted Phase II ESA investigation activities.

According to the report entitled *Existing Conditions Investigation and Proposed Modifications to Landfill Cover System, Supplside Landfil, Naval Station Great Lakes, Illinois*, dated August 2003, prepared by Versar, Inc. (Versar), the Supplside Landfill was used from 1969 to 1983 and reportedly contains office, food, and residential waste, and construction/demolition debris. Versar was retained by the Navy to conduct soil borings and installation and sampling of temporary monitoring wells to evaluate existing soil cover thickness and geotechnical properties, measure subsurface soil gas (methane) concentrations, and determine depth and chemical disposition of leachate. Soil gas measurements were performed with a hand-held landfill gas meter in twenty-three (23) soil gas probes within the main landfill area and ten (10) outside of it. Versar reported that methane measurements ranged from 0.3% to 73.8% in the twenty-three (23) soil gas probes set

in the main landfill and from 0 to 37.2% in the ten (10) soil gas probes set outside the main landfill. Of the ten (10) located outside of the main landfill, the highest readings detected were exhibited from gas probes along the western side of the landfill and Versar indicated that decomposition from nearby wetlands could influence the methane levels in this area. In addition to the soil gas probes, Versar also measured methane in existing gas vents at the Supplyside Landfill. Generally, lower levels of methane readings were detected in these gas vents and Versar concluded that these existing vents either do not extend deep enough into the landfill waste or have filled with water sufficiently so that methane does not enter the vents. Based upon this investigation, Versar recommended enhancements to the landfill soil cap, installation of a landfill gas ventilation system, and continued long-term groundwater monitoring. No documentation of implementation of these recommendations was discovered during the document review process.

2.1.7 IR Sites 18 & 20 – Monazite Sand Area & Radium-Contaminated Soil Area

A former monazite sand storage area and an area of radium contaminated soil are present offsite, west of the subject property on the Supplyside portion of Forrestal Village near Buildings 3214 and 3215, west of the housing area. Although this site is west of the boundary of the subject property, the proximity of this site to housing units warranted Phase II ESA investigation activities.

During the 1950's through the 1980's, the Defense Reutilization Material Office maintained a yard for recycled metals. The operation consisted of crushing scrap metal and sending it to a recycler. The recycled metals included radium-containing equipment. It is possible that radium-containing equipment remains buried in this area. Elevated levels of radium in the soil were found to be at 750,000 counts per minute (cpm), while background is approximately 5,000 cpm. These areas have been identified by the Navy as Installation Restoration sites 18 and 20. According to the report entitled *Draft Work Plan for Radiological Remediation and Final Status Survey at Great Lakes Naval Training Center, Great Lakes, Illinois*, dated November 21, 2001, prepared by Cabrera Services, Inc. (Cabrera); this area was used to store monazite sand, a thorium-bearing material. The Monazite Sand Area was investigated by the Nuclear Regulatory Commission and Cabrera. According to the *Environmental Baseline Survey, Public / Private Venture Housing Privatization, Naval Station Great Lakes, Great Lakes, Illinois* prepared for NAVAL Facilities Engineering Command, Southern Division, dated March 2004, the Radium-Contaminated Soil Area is undergoing remediation. During the performance of the Phase II ESA, the Navy verbally indicated that Cabrera was continuing the remediation of these areas, but also indicated that some of the monazite sand material could have been used as fill material near a storm sewer outfall to Skokie Ditch east of IR Sites 18 and 20.

2.1.8 Buildings 3028G, 3156D, and 3160D

Onsite Buildings 3028G, 3156D, and 3160D are existing residential structures located in the Forrestal Village. Building 3028G (3028G East Wyoming Avenue) is located within the north central portion of Forrestal Village. Buildings 3156D and 3160D (both on Texas Court) are located in the northwest corner of Forrestal Village. Reports entitled *Lead Management Plan, Forrestal Wherry 14 Unit Apartments, Naval Training Center (NTC), Great Lakes, Illinois* and *Lead Management Plan, Forrestal/Hospital Capehart, Naval Training Center (NTC), Great Lakes, Illinois* (dates unknown), prepared by the Navy, indicated that soil samples collected at Buildings 3028G, 3156D, and 3160D exhibited lead concentrations above its TACO Tier 1 residential soil remediation objective. Documentation of remediation at these locations was not discovered during the document review process.

2.2 Mainside

Four (4) residences within the Mainside portion of the subject property were identified for Phase II ESA activities. These included Quarters D, K, I, and Building 64. Quarters D, K, and I are located within the

Brick Row portion of Mainside. The Brick Row houses include twelve single family two- and three-story dwellings constructed from 1908 to 1918. Building 64 is a single family unit located in Squirrel Hollow at Mainside. Reports entitled *Lead-Based Paint Risk Assessment Mainside Village – OPQ 1911, Great Lakes NTC, Great Lakes, Illinois*, and *Lead-Based Paint Risk Assessment Mainside Village – OPQ 1918, Great Lakes NTC, Great Lakes, Illinois*, both dated March 3, 2005 and prepared by GLE Associates, Inc. indicated that soil samples collected at Quarters I and Building 64 exhibited lead concentrations above its TACO Tier 1 residential soil remediation objective. Likewise, a report entitled *Lead Management Plan, Brick Row Naval Training Center (NTC), Great Lakes, Illinois* dated May 1998, prepared by the Navy, indicated that soil samples collected at D, K, I, and Building 64 exhibited lead concentrations above its TACO Tier 1 residential soil remediation objective. Documentation of remediation at these locations was not discovered during the document review process.

2.3 Hospital Cove

Three (3) residences within the Hospital Cove portion of the subject property were identified for Phase II ESA activities. These included Buildings 202H, 204H, and 209H. Hospital Cove contains five two-story duplex buildings in Fishbowl (including 209H) constructed in 1943. Three two-story duplex buildings immediately north of Fishbowl were constructed in 1962. Of the remaining four single unit structures, Building 204H located on the west side of Eleventh Street was constructed in 1927; and Buildings 201H, 202H, and 203H were constructed in 1909. A report entitled *Lead-Based Paint Risk Assessment Hospitalside Village – 1909, Great Lakes NTC, Great Lakes, Illinois*, dated March 3, 2005, prepared by GLE Associates, Inc. indicated that soil samples collected at Building 202H exhibited lead concentrations above its TACO Tier 1 residential soil remediation objective. A report entitled *Comprehensive Environmental Survey, Building 204H, Naval Station Great Lakes, Great Lakes, Illinois*, dated November 12, 2004, prepared by Versar, Inc. indicated that a soil sample collected at Building 204H exhibited a lead concentration above its TACO Tier 1 residential soil remediation objective. A report entitled *Comprehensive Environmental Survey, Fish Bowls, Buildings 205A, 205B, 206A, 206B, 207A, 207B, 208A, 209A, and 209B, Naval Station Great Lakes, Great Lakes, Illinois*, dated November 12, 2004, prepared by Versar, Inc. indicated that a soil sample collected at Building 2094H exhibited a lead concentration above its TACO Tier 1 residential soil remediation objective. Documentation of remediation at these locations was not discovered during the document review process.

2.4 Site Geology/Hydrogeology

As discussed in MACTEC's Phase I ESA Report (MACTEC, 2005), the subject site and surrounding area are located in the Wheaton Morainal Complex of the Great Lakes Section of the Central Lowland Province. NAVSTA Great Lakes is part of the Bluff-Ravine sub-complex characterized by level lands that are bordered by steep bluffs that face Lake Michigan and a network of interior ravines. The geology of Lake County is described as unconsolidated glacial till overlying Silurian age dolomite. The most recent period of glaciation is primarily responsible for present-day landforms. The unconsolidated glacial deposits range in thickness from 100 to 300 feet.

The surficial soils at the subject site area are classified as MORLEY (MACTEC, 2005). A generalized geologic description from ground surface to bedrock is 100 to 150 feet of fine-grained till underlain by 10 to 50 feet of sand and gravel. The sand and gravel is underlain by 10 to 50 feet of fine-grained till, which is positioned over Silurian-age dolomitic bedrock. Soils at NAVSTA Great Lakes are derived from glacial till deposited 600,000 years ago and consist of poorly sorted mixture of silts, clays, sands and pebbles (Environmental Baseline Survey, Project Resources, Inc., March 2004).

Based on test boring records from Phase II ESA activities, subsurface soils consist generally of a brownish-gray silty clay, with some sand and/or gravel of varying percentages, to a depth of 12 feet bgs, the maximum depth explored.

The topography of NAVSTA Great Lakes is generally characterized as flat with deeply incised, branching ravines containing Skokie Ditch and its tributaries. The major portion of the base is situated on a bluff, along the western shores of Lake Michigan. A topographic map review indicates an easterly gradient, towards Lake Michigan. However, further review indicates that NAVSTA Great Lakes is located within two major drainage basins. Green Bay Road, which runs north to south through the base, was constructed on a topographic high which serves as a divide between the Lake Michigan Watershed and the Mississippi River Watershed. Areas east of Green Bay Road drain toward Lake Michigan. Areas to the west drain toward the Mississippi River through a system of tributaries and rivers.

There are five water-bearing hydrogeologic units located beneath NAVSTA Great Lakes. These aquifers in order of increasing depth below surface are: the Glacial Drift, the Silurian Dolomite, the Glenwood St. Peter Sandstone, the Ironton-Gales Sandstone, and the Mount Simeon Sandstone. In most areas of NAVSTA Great Lakes, the water table is generally within 10 feet of the ground surface and will intersect the surface in low-lying areas. The shallow water table intersects Skokie Ditch after periods of heavy rainfall. Groundwater movement is primarily horizontal through the till, and rates of movement are slow due to low hydraulic conductivities. It is expected that shallow groundwater flows to the east toward Lake Michigan at the portion of the subject property.

2.5 Other Environmental Conditions

During the document review as part of the Phase I ESA, MACTEC reviewed radon results for Mainside, Halsey Village, Nimitz Village, and Forrestal Village dating back to 1991. Results indicated buildings in each of these areas had radon levels which exceeded the US Environmental Protection Agency action level of 4 pCi (picoCuries). Some of the buildings were re-sampled, with the subsequent sampling results below the action level. Documentation that mitigation (installation of venting) has been conducted in these buildings was not discovered. No additional radon testing was performed during the Phase II ESA.

Furthermore, during the Phase I ESA, the Navy verbally indicated to MACTEC that the Navy has encountered transite and other asbestos-containing materials (ACM) in topsoil at various locations within Nimitz Village, Halsey Village, and within the Forrestal Village landfill soil cap. More recently, the Navy verbally indicated to MACTEC that ACM in the topsoil has been encountered at various locations within Forrestal Village. No soil samples were collected and analyzed for ACM during the Phase II ESA.

3.0 FIELD INVESTIGATION

The Phase II ESA consisted of collecting soil samples (surface and subsurface), a groundwater sample collected at one (1) location, measuring methane at temporarily-installed soil-gas vents and conducting a radiological survey to evaluate areas of concern identified during MACTEC's document review. The Phase II ESA investigation was performed during July, August, and September 2005. The Phase II ESA was performed as presented in this section using the procedures specified. Representative photographs of the soil sampling activities are provided in Appendix A.

3.1 Underground Utility Location Procedures

Prior to commencement of any intrusive activities, Illinois' Joint Utility Locating Information for Excavators (JULIE) was notified by the drilling subcontractors a minimum of 48-hours prior to commencement of work so any underground utilities near or within the Site could be located and marked.

A joint meeting was held with the utility company representatives at the subject property prior to commencement of each phase for the Phase II ESA. Maps showing the boring locations were provided. Additionally, the physical location of the proposed soil borings were marked with white spray paint and white wire flags for utility mark-out purposes.

3.2 Soil Sampling Procedures

3.2.1 Surface Soil

All surface soil samples (0 to 0.5 feet below ground surface) were collected using a stainless-steel trowel and/or spoon after clearing away any debris on the ground surface. Sediment samples were collected with a stainless steel hand auger from below the water line. A new pair of nitrile gloves was donned by the MACTEC scientist between each sampling location. Stainless steel trowels, spoons, or hand augers used in sampling were decontaminated between sampling locations. Equipment decontamination procedures are discussed below.

3.2.2 Subsurface Soil - Geoprobe®

All subsurface soil samples submitted for laboratory analysis were collected using a Geoprobe® rig provided by Paramount Environmental Services, Inc., Portage, Indiana. The Geoprobe® rig was equipped with a four-foot long stainless-steel sampler lined with a new plastic liner (for each sample interval). Soil samples were collected continuously. A MACTEC geologist or engineer visually logged the soil samples from each location using the Unified Soil Classification System. All Test Boring Records are contained in Appendix B. Additionally headspace samples were conducted by placing a small volume of each 2-foot sample increment into a zip-lock bag. The bag was sealed to allow any vapors in the soil to come into equilibrium with the air in the bag. The sample was then screened by piercing the bag with the tip of a photoionization detector (PID). The highest PID response was then recorded on the boring log. The soil sample selected for laboratory analysis at each sampling location was based on the head space PID readings, visual observations (i.e. staining), or depth. If PID readings were not detected and there was no visible staining, then a soil sample was selected based on depth below ground surface. A new pair of nitrile gloves was donned by the MACTEC geologist/engineer between each sampling location. Upon completion of sampling, each Geoprobe® borehole was backfilled with soil cuttings and/or granular bentonite. Sampler decontamination procedures are discussed below. If a stainless steel trowel or spoon was used to assist in sample collection, it was decontaminated as described below.

3.2.3 Sample Handling Procedures

Soil samples were collected in laboratory-supplied, USEPA-approved four-ounce glass sample jars. Volatile organic soil sample collection procedures conformed to SW-846 Method 5035 "Closed System Purge and Trap and Extraction for Volatile Organics in Soil and Wastes Sample". To reduce the possibility of cross contamination between samples, a new pair of disposable latex gloves was donned by the sampler for each sample collected. Upon collection, the sample jars were labeled with the site name, sample number, date, time, and sampler initials, and were sealed in Ziploc bags and placed in an iced cooler. A chain-of-custody form was updated as samples were collected. Samples were submitted to the laboratory on a daily basis. For all sampling events, analytical services were provided by STAT Analysis Corporation (STAT) of Chicago, Illinois under direct contract by MACTEC. Samples were picked up at the site by STAT or hand-delivered by the MACTEC sampler under a completed chain of custody form to the laboratory. Laboratory Reports are contained in Appendix C.

3.2.4 Equipment Decontamination Procedures

Soil sampling equipment was decontaminated by washing in an Alconox detergent and potable water solution, rinsing with potable water, and then final rinsing with distilled water. In addition, a new single-use, disposable plastic liner was used for each sample interval collected using the Geoprobe® rig.

3.3 Methane Monitoring

3.3.1 Soil-Gas Vent Installation Procedures

Soil-gas vents were constructed in the Geoprobe® borehole after advancing the hollow drilling casing fitted with an expendable point. Samples were not collected from the boreholes. Upon advancement of the drilling casing to the desired depth, the soil-gas vents were constructed using 1-inch diameter polyvinyl chloride (PVC) well casing with either a 5 or 10-foot section of slotted (0.010-inch) well screen (depending on the location) inside the casing. As the casing was withdrawn, the expendable point was left in the ground. The annular space around the well screen was backfilled with sand to a height of approximately 1 foot above the top of the well screen. The remainder of the annular space was backfilled with bentonite chips to ground surface. The top of the PVC well casing generally extended approximately at least 1.5 feet above ground surface. A PVC slip cap was then placed on top of each well casing.

Soil-gas vents GV1 through GV20 were installed around the Forrestal Village Landfill. GV1 through GV20 were located outside of the landfill footprint on the north, east, and south sides of the landfill. Each was advanced to 10 feet bgs and was fitted with a 5-foot well screen. Soil-gas vents GV21 through GV25 were installed east of the Supplside Landfill, east of the Skokie Ditch along the western perimeter of the housing area. Soil-gas vents GV21 through GV25 were advanced to 16 feet bgs and were fitted with 10-foot well screens.

3.3.2 Methane Monitoring Procedures

Methane, in addition to carbon dioxide and oxygen, was monitored at the temporary soil-gas wells (GV1 through GV25) using a GEM™ 2000 Landfill Gas Extraction Monitor. Prior to monitoring, the GEM™ 2000 monitor was calibrated in the field using a calibration gas composed of 50% methane and 25% carbon dioxide. The depth of water in each well and total well depth was measured to calculate the length of well screen exposed above the water table, if present. At the soil-gas vents installed around the Forrestal Village Landfill, exposed screen lengths ranged from 0.02 feet in GV 10 to 5 feet in GV14 for those soil-gas vents where the water table was not above the top of the well screen. The water table was measured at 0.26 feet to 1.62 feet above the top of the well screen in five (5) of the soil-gas vents at the

Forrestal Village Landfill (GV2, GV4, GV7, GV8, and GV9). At the soil-gas vents installed east of the Supplyside Landfill, exposed screen lengths ranged from 0.07 feet in GV 21 to 1.75 feet in GV24 for those soil-gas vents where the water table was not above the top of the well screen. The water table was measured at 1.8 feet above the top of the well screen in one (1) soil-gas vent (GV25) at the Supplyside Landfill.

Individual wells were monitored by attaching a piece of flexible tubing to a fitting on each wellhead and recording methane, carbon dioxide and oxygen readings at approximately one minute intervals for a length of 1 to 15 minutes. When monitoring was completed, the flexible tubing was removed and a PVC slip cap was replaced on top of the well.

3.4 Investigation-Derived Wastes

All leftover soils were placed back into boreholes. Bentonite chips were placed into the boreholes to make up any deficit. All acetate sleeves and used gloves were taken offsite and disposed in trash receptacles.

3.5 Area-Specific Procedures

The investigation performed for the Phase II ESA at each area of concern is described in the sections that follow. Table 1 summarizes the potential environmental concerns of each of the sites and the Phase II scope of work performed.

3.5.1 Forrestal Village

Details of the particular Phase II ESA activities performed at each site within Forrestal Village are described in the sections that follow.

3.5.1.1 Onsite LUST Site at Building 2710 (Citgo Station)

Based on information from MACTEC's document review, it is possible that contaminants from this LUST site had impacted the housing area on the subject property west of this LUST site. Review of existing documents indicated that BTEX and MTBE-impacted soil and groundwater are present at concentrations that exceeded TACO Tier 1 residential remediation objectives at this site. To evaluate whether contaminants have impacted the subject property to the west, MACTEC completed four (4) soil borings (SB-11, SB-12, SB-13, and SB-14) and collected soil samples using a Geoprobe® rig in accordance with the procedures indicated in Section 3.1 above. These borings were located on the western side of Meridian Drive directly across from this LUST site. The soil borings and sampling at this site were performed on June 23, 2005. Soil boring locations are shown on Figure 4. Each boring was completed to a depth of 8 feet bgs and one (1) soil sample was collected from each boring for laboratory analysis in accordance with Section 3.1.2.2. In addition, one (1) groundwater sample was collected from boring SB-13 by installing a 1-inch diameter temporary PVC well screen and allowing the water to accumulate. The water was obtained from the temporary well screen with a length of polyethylene tubing attached to a peristaltic pump. Boring SB-13 was the only soil boring with sufficient water to allow collection of a groundwater sample. The groundwater sample was collected to assess groundwater impacts to the housing area from the LUST site.

The soil samples collected from borings SB-11, SB-12, SB-13, and SB-14 were submitted to MACTEC's subcontracted laboratory, STAT Analysis of Chicago, Illinois (STAT), for analysis of BTEX and MTBE compounds using USEPA Test Method 5035/8260B. The groundwater sample collected from SB-13 was analyzed for BTEX and MTBE compounds using USEPA Test Method 82608.

3.5.1.2 Offsite LUST Site at Building 3216

Based on information from MACTEC's document review, it was unclear whether contaminants from this offsite LUST site had impacted the housing area on the subject property east of this LUST site. Review of existing documents indicated that benzene, TCLP lead, and one (1) SVOC in soil at this site were present at concentrations that exceeded TACO Tier 1 residential remediation objectives. To evaluate whether contaminants had impacted the subject property to the east and to confirm the previous sample results, MACTEC completed four (4) soil borings (SB-3, SB-4, SB-5, and SB-6) and collected soil samples using a Geoprobe® rig in accordance with the procedures indicated in Section 3.1 above. The soil borings and sampling at this site were performed on June 22, 2005. Soil boring locations are shown on Figure 5. Soil borings SB-3 and SB-4 were located on the western side of Mississippi Street directly east of this former LUST site. Soil borings SB-5 and SB-6 were located in the former product dispenser island location to confirm the previous results. Each boring was completed to a depth of 4 feet bgs and one (1) soil sample was collected from each boring for laboratory analysis in accordance with Section 3.1.2.2.

The soil samples collected from borings SB-3, SB-4, SB-5, and SB-6 were submitted to MACTEC's subcontracted laboratory, STAT, for analysis for BTEX compounds using USEPA Test Method 5035/8260B and SVOCs using USEPA Test Method 8270C.

3.5.1.3 Offsite LUST Site at Building 3511

Based on information from MACTEC's document review, it was unclear whether contaminants from this offsite LUST site had impacted the housing area on the subject property east of this LUST site. Review of existing documents indicated that PNAs in soil at this site were present at concentrations that exceeded TACO Tier 1 residential soil remediation objectives. To evaluate whether contaminants had impacted the subject property to the east, MACTEC performed two (2) soil borings (SB-1 and SB-2) and collected soil samples using a Geoprobe® rig in accordance with the procedures indicated in Section 3.1 above. These borings were located on the western side of Mississippi Street directly east of Building 3511. The soil borings and sampling at this site was performed on June 22, 2005. Soil boring locations are shown on Figure 5. Each boring was completed to a depth of 12 feet bgs and one (1) soil sample was collected from each boring for laboratory analysis in accordance with Section 3.1.2.2.

The soil samples collected from borings SB-1 and SB-2 were submitted to MACTEC's subcontracted laboratory, STAT, for analysis for PNAs using USEPA Test Method 8270C.

3.5.1.4 Onsite UST Site at 3134 Montana Avenue

Navy personnel informed MACTEC that an UST had been discovered at this site. To evaluate whether this UST and the petroleum product it may contain have impacted the subject property, MACTEC completed four (4) soil borings (SB-7, SB-8, SB-9, and SB-10) and collected soil samples using a Geoprobe® rig in accordance with the procedures indicated in Section 3.1 above. The soil borings and sampling at this site was performed on June 23, 2005. Soil boring locations are shown on Figure 4. Prior to placement of the soil borings, MACTEC used a magnetic detector to determine the approximate position of the UST. Soil borings SB-7, SB-8, SB-9, and SB-10 were generally located around the determined position of the UST. The apparent location of the UST was located immediately south of a row of dense shrubbery along the southern edge of 3136 Montana Avenue so a boring could not be located north of the UST position. Each boring was completed to a depth of 8 feet bgs and one (1) soil sample was collected from each boring for laboratory analysis in accordance with Section 3.1.2.2.

The soil samples collected from borings SB-7, SB-8, SB-9, and SB-10 were submitted to MACTEC's subcontracted laboratory, STAT, for analysis for BTEX compounds using USEPA Test Method 5035/8260B and PNAs using USEPA Test Method 8270C.

3.5.1.5 IR Site 2 – Forrestal Village Landfill

Based on information from MACTEC's document review, elevated levels of methane were previously detected in and around the Forrestal Village Landfill. To evaluate the impact of the methane on the subject property, MACTEC installed twenty (20) soil-gas vents (GV1 through GV20) beyond the delineated waste boundaries of the landfill along its southern, eastern, and northern sides. The soil-gas vents were installed and methane was measured in each in accordance with the procedures indicated in Section 3.1 above. The soil-gas vents were installed on June 21 and 22, 2005. Methane monitoring was conducted on July 8 and 11, 2005. Figure 6 shows the soil-gas vent locations.

3.5.1.6 IR Site 3 – Supplyside Landfill

Based on information from MACTEC's document review, elevated levels of methane were previously detected in and around the Supplyside Landfill. To evaluate the impact of the methane on the subject property, MACTEC installed five (5) soil-gas vents (GV21 through GV25) east of the Supplyside Landfill, east of the Skokie Ditch along the western perimeter of the housing area. The soil-gas vents were installed and methane was measured in each in accordance with the procedures indicated in Section 3.1 above. The soil-gas vents were installed on June 22, 2005. Methane monitoring was conducted on July 8, 2005. Figure 7 shows the soil-gas vent locations.

3.5.1.7 IR Sites 18 & 20 – Monazite Sand & Radium-Contaminated Soil Areas

Based on information from MACTEC's document review, elevated levels of thorium-232 and radium-226 were detected in soils in these areas. To evaluate the impact of these radioactive isotopes on the subject property, MACTEC conducted a preliminary radiation screening survey of the subject property east of these areas. The survey was conducted on July 29, 2005. Due to elevated radiation levels that were detected in the survey area, MACTEC determined that a more thorough radiological survey of the area designed and performed by health physicists was warranted. MACTEC performed the additional radiological survey on September 6, 7, and 8, 2005. This additional radiological survey confirmed the presence of radiological impacts from thorium on the surveyed property.

Because of the elevated gross gamma readings detected during the above-mentioned radiological survey, Forest City authorized MACTEC to perform an additional radiological survey in areas within and immediately north, south, and east of the previously identified impacted locations. MACTEC performed the additional radiological survey from November 11 to November 21, 2005. The survey included a walk-over survey to measure gross gamma radiation readings and collection of near-surface soil and slag/rock samples for laboratory radiological analysis from several locations at which elevated gamma readings were identified. The survey and laboratory analysis confirmed the locations of the previous impacted areas and identified additional locations where elevated gamma readings were detected and where soil sample results were above the screening levels. The procedures employed and results of this survey are presented in Appendix D.

3.5.1.8 Buildings 3028G, 3156D, and 3160D

Based on information from MACTEC's document review, lead concentrations in surficial soil samples collected at each of these buildings exceeded TACO Tier 1 residential soil remediation objectives. To verify these previous results, MACTEC collected one (1) surficial soil sample at each of these sites.

Figure 4 shows the surficial soil sample locations. The previous reports reviewed did not contain figures showing the specific location of the previous soil samples, nor did they specify which side of the buildings the samples were collected. Therefore, it is unclear whether the soil sample locations selected by MACTEC coincide with the previous sample locations.

3.5.2 Mainside

Based on information from MACTEC's document review, lead concentrations in surficial soil samples collected at Quarters D, K, I, and Building 64 at Mainside exceeded TACO Tier 1 residential soil remediation objectives. Previously collected soil samples at Quarters I and Building 64 were composited from up to seven (7) discrete locations. To verify that compositing did not dilute elevated lead concentrations in these previous results, MACTEC collected one (1) surficial soil sample at each of the previous discrete sample locations at Quarters I and Building 64. Compositing was not performed for the previous samples collected at Quarters D and K. Instead, the reports indicated from which side of the building the samples were collected. Figure 8 shows the surficial soil sample locations at the Mainside residences. All soil samples were collected on July 29, 2005.

The surficial soil samples collected at Quarters D, K, I, and Building 64 were submitted to MACTEC's subcontracted laboratory, STAT, for analysis of total lead by USEPA Test Method 6020. Due to elevated total lead levels in the soil samples collected at the Mainside and Hospital Cove residences, four (4) Mainside soil samples were also analyzed for TCLP lead by USEPA Test Method 1311/6020 to determine whether the soil could be considered a characteristic hazardous waste.

3.5.3 Hospital Cove

Based on information from MACTEC's document review, lead concentrations in surficial soil samples collected at Buildings 202H, 204H, and 209H at Hospital Cove exceeded TACO Tier 1 residential soil remediation objectives. Previously collected soil samples at Building 202H were composited from five (5) discrete locations. To verify that compositing did not dilute elevated lead concentrations in these previous results, MACTEC collected one (1) surficial soil sample at each of the previous discrete sample locations at Building 202H. Compositing was not performed for the previous samples collected at Buildings 204H, and 209H. Instead, the reports indicated from which side of the building the samples were collected. Figure 9 shows the surficial soil sample locations at the Hospital Cove residences. All soil samples were collected on July 29, 2005.

The surficial soil samples collected at Buildings 202H, 204H, and 209H were submitted to MACTEC's subcontracted laboratory, STAT, for analysis of total lead by USEPA Test Method 6020. Due to elevated total lead levels in the soil samples collected at the Mainside and Hospital Cove residences, one (1) Hospital Cove sample was also analyzed for TCLP lead by USEPA Test Method 1311/6020 to determine whether the soil could be considered a characteristic hazardous waste.

4.0 RESULTS

The results of the Phase II ESA are presented in this Section. Analytical results of the samples collected for the Phase II ESA are summarized in Tables 2 through 6 and Tables 9 through 13. Tables 7 and 8 contain the methane monitoring results for the soil-gas vents. Analytical results included in these tables are compared to Tiered Approach to Corrective Action Objectives (TACO) Tier 1 Remediation Objectives for 1) Residential Properties, 2) the Soil Component of the Groundwater Ingestion Exposure Route for both Class I and Class II groundwater, and 3) for Construction Worker safety. In addition, background values for counties within the metropolitan statistical areas are listed on the tables as published in an IEPA document discussing background PNA concentrations. Generally, comparison to the background levels is only permissible with approval from the IEPA evaluated on a site-by site basis. Since this site is not entered into an IEPA cleanup program at this point, the background values are only listed for reference. The complete analytical data packages from the laboratory are included in Appendix C.

4.1 Forrestal Village

The following sections discuss the sample results for areas investigated in Forrestal Village during the Phase II ESA.

4.1.1 Onsite LUST Site at Building 2710 (Citgo Station)

A total of four (4) subsurface soil samples, one (1) from each boring performed in this area (SB-11, SB-12, SB-13, and SB-14) were collected for laboratory analysis to evaluate the impact of this site on the subject property. All soil samples were analyzed for BTEX and MTBE. Results are summarized on Table 2. Toluene was the only compound detected in any of the samples. Toluene was detected in the samples collected from SB-11 and SB-14. The concentrations of toluene in these samples were below its TACO Tier 1 residential soil remediation objectives.

One (1) soil boring, SB-13, conducted at this site contained sufficient water to allow for collection of a groundwater sample for analysis to evaluate the impact of this site on the subject property. The groundwater sample was analyzed for BTEX and MTBE. Results are summarized on Table 3. No compounds for which the sample was tested were detected in the groundwater sample.

4.1.2 Offsite LUST Site at Building 3216

A total of four (4) subsurface soil samples, one (1) from each boring performed in this area (SB-3, SB-4, SB-5, and SB-6) were collected for laboratory analysis to evaluate the impact of this site on the subject property. All soil samples were analyzed for BTEX and SVOCs. Results are summarized on Table 4.

No BTEX compounds were detected in the samples collected from SB-3, SB-4, SB-5. Benzene, toluene, ethylbenzene and xylenes were detected in the sample from SB-6 collected in the former product dispenser location. The benzene concentration in this sample (2.3 milligrams per kilogram [mg/kg]) exceeded its TACO Tier 1 residential soil remediation objectives for soil inhalation (0.8 mg/kg), the soil to groundwater ingestion component for sites with Class I (0.03 mg/kg) and Class II (0.17 mg/kg) groundwater, and the construction worker inhalation objective (2.2 mg/kg).

Several PNAs were detected in the samples collected from SB-4 and SB-6. None of the concentrations of PNAs, however, exceeded their respective TACO Tier 1 residential soil remediation objectives. One (1) SVOC (bis(2-ethylhexyl)phthalate) was detected in the sample collected from SB-3, but was below its

TACO Tier 1 residential soil remediation objectives. Three (3) other SVOCs (2-methylnaphthalene, carbazole, and dibenzofuran) were detected in the sample collected from SB-6 collected in the former product dispenser location. The concentration of carbazole was detected at 0.97 mg/kg which exceeded its TACO Tier 1 residential soil remediation objectives for the soil to groundwater ingestion component for sites with Class I groundwater (0.6 mg/kg) in the SB-6 sample.

4.1.3 Offsite LUST Site at Building 3511

A total of two (2) subsurface soil samples, one (1) from each boring performed in this area (SB-1 and SB-2), were collected for laboratory analysis to evaluate the impact of this site on the subject property. All soil samples were analyzed for PNAs. Results are summarized on Table 5. Only one (1) PNA was detected in one of the samples. Phenanthrene was detected in the sample collected from soil boring SB-1, but was below its TACO Tier 1 residential soil remediation objective which was obtained from the "Table A: Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals," dated October 1, 2004, obtained from the IEPA's website. The objectives for these Non-TACO chemicals are not approved for use unless a site is entered into an IEPA clean-up program and they are approved by an IEPA Project Manager.

4.1.4 Onsite UST Site at 3134 Montana Avenue

A total of four (4) subsurface soil samples, one (1) from each boring performed in this area (SB-7, SB-8, SB-9, and SB-10) were collected for laboratory analysis to evaluate the impact of this site on the subject property. All soil samples were analyzed for BTEX and PNAs. Results are summarized on Table 6. No BTEX compounds were detected in any of the samples collected. Several PNAs were detected in the samples collected from SB-8 and SB-9. None of the concentrations of PNAs, however, exceeded their respective TACO Tier 1 residential soil remediation objectives.

4.1.5 IR Site 2 – Forrestal Village Landfill

Methane monitoring was conducted at each of the soil-gas vents (GV-1 through GV-20) installed at the Forrestal Village Landfill. The methane monitoring results for the Forrestal Landfill soil-gas vents are shown on Table 7. Only one (1) soil-gas vent, GV-16, had detectable levels of methane. The methane in this soil-gas vent ranged from 1.5% to 12.4%. As shown on Figure 6, GV-16 is located in the southeast corner of the area.

4.1.6 IR Site 3 – Supplyside Landfill

Methane monitoring was conducted at each of the soil-gas vents (GV-21 through GV-25) installed east of the Supplyside Landfill. The methane monitoring results for the Supplyside Landfill soil-gas vents are shown on Table 8. No methane was detected in any of the soil-gas vents.

4.1.7 IR Sites 18 & 20 – Monazite Sand & Radium-Contaminated Soil Areas

A preliminary radiological screening survey was conducted to determine what was the impact, if any, of these sites on the property east of these sites. A walk-over survey was performed using a hand-held gamma radiation detector. Two (2) background level readings were also measured in the survey area. Two locations with elevated gamma radiation readings were identified during this preliminary survey.

Because of the elevated gross gamma radiation readings detected during the preliminary radiological screening survey, MACTEC implemented an additional radiological assessment survey conducted by MACTEC's health physicists. This additional radiological assessment survey also included a walk-over survey, but also included the collection of soil and sediment samples from and adjacent to Skokie Ditch for laboratory radiological analysis. Both the gross gamma measurements and sediment samples from

Skokie Ditch showed that the sediments are impacted with elevated concentrations of radioactivity (thorium). Soil samples collected were found to have concentrations of radioactivity more than 20 times the United States Nuclear Regulatory Commission's published surface soil screening values and elevated gamma screening values. The elevated concentrations of thorium in the soil raised a concern that such concentrations might be more widespread.

Because of the elevated gross gamma radiation readings detected during the previous radiological surveys, Forest City authorized MACTEC to perform an additional radiological survey in Forrestal Village areas within and immediately north, south, and east of the previously identified impacted locations. The procedures employed and results of this survey are presented in Appendix D.

4.1.8 Buildings 3028G, 3156D, and 3160D at Forrestal Village

A total of three (3) surficial soil samples were collected at Forrestal Village to confirm previously detected lead impacted surficial soil at these residences. One (1) sample was collected from each of these buildings (3160D, 3156D, and 3028G) for laboratory analysis. All soil samples were analyzed for total lead. Results are summarized on Table 9. Lead was detected in each of the samples. The concentrations ranged from 87 mg/kg to 170 mg/kg. These concentrations are below the TACO Tier 1 residential soil remediation objective for the soil ingestion pathway and the industrial/commercial soil remediation objective for construction workers (400 mg/kg for both).

4.2 Mainside

A total of sixteen (16) surficial soil samples were collected at Quarters D, K, and I and Building 64 at Mainside to confirm previously detected lead impacted surficial soil at these residences. Two (2) samples were collected at Quarters D, two (2) were collected at Quarters K, seven (7) were collected at Quarters I and five (5) were collected at Building 64 for laboratory analysis. All soil samples were analyzed for total lead and four (4) samples were analyzed for TCLP lead. Results are summarized on Table 10.

Lead was detected in each of the samples. The concentrations ranged from 97 mg/kg to 13,000 mg/kg. The total lead concentrations in fifteen (15) of the samples were above the TACO Tier 1 residential soil remediation objective for the soil ingestion pathway and the industrial/commercial soil remediation objective for construction workers (400 mg/kg for both). TCLP lead was detected in the four (4) samples analyzed for TCLP lead. The TCLP lead concentrations ranged from 2.2 milligrams per liter (mg/L) to 9.6 mg/L. All four (4) samples exceeded the TACO Tier 1 residential soil remediation objective for the soil component of groundwater ingestion pathway of 0.0075 mg/L and 0.1 mg/L for sites with Class I and Class II groundwater, respectively. In addition, two (2) of the TCLP lead levels exceeded the USEPA toxicity characteristic criteria for hazardous waste classification for lead of 5 mg/L.

4.3 Hospital Cove

A total of seven (7) surficial soil samples were collected at Buildings 202H, 204H, and 209H at Hospital Cove to confirm previously detected lead impacted surficial soil at these residences. Five (5) samples were collected at Building 202H, one (1) was collected at Building 204H, and one (1) was collected at Building 209H for laboratory analysis. All soil samples were analyzed for total lead and one (1) sample was analyzed for TCLP lead. Results are summarized on Table 11.

Lead was detected in each of the samples. The concentrations ranged from 290 mg/kg to 14,000 mg/kg. The total lead concentrations in six (6) of the samples were above the TACO Tier 1 residential soil remediation objective for the soil ingestion pathway and the industrial/commercial soil remediation objective for construction workers (400 mg/kg for both). TCLP lead was detected at 7 mg/L in the sample analyzed for TCLP lead. This concentration exceeds the TACO Tier 1 residential soil remediation

objective for the soil component of groundwater ingestion pathway of 0.0075 mg/L and 0.1 mg/L for sites with Class I and Class II groundwater, respectively. In addition, this TCLP lead level exceeds the USEPA toxicity characteristic criteria for hazardous waste classification for lead of 5 mg/L.

5.0 CONCLUSIONS

Based upon the analytical testing of soil samples collected during the Phase II ESA as presented in Section 4.0, and comparison of the testing results to TACO Tier 1 soil remediation objectives for residential property use and for construction workers from exposure, MACTEC has drawn the following conclusions regarding the subsurface environmental conditions at the subject property:

5.1 Forrestal Village

- Onsite LUST at Building 2710 (Citgo Station): While the LUST site at Building 2710 (Citgo Station) is within the boundary of the subject property, MACTEC understands that the site will not be part of the transaction. BTEX and MTBE concentrations in soil samples and one (1) groundwater sample collected along the west side of Meridian Drive across from the UST site at Building 2710 (Citgo Station) were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, MACTEC concludes that the LUST site at Building 2710 (Citgo Station) has not affected the subject property.
- Offsite LUST Incident, Building 3216: One (1) soil sample collected in shallow soil at the former dispenser island at the offsite LUST incident at Building 3216 exhibited residual contaminant concentrations above TACO Tier 1 soil remediation objectives for residential property use and for construction workers. In this sample, the benzene concentration exceeded the TACO Tier 1 residential soil remediation objectives for the inhalation pathway, the soil component of groundwater exposure route for sites with Class I and Class II groundwater, and the industrial/commercial objectives for the inhalation pathway for construction workers. In addition, the naphthalene in this sample exceeded the Tier 1 industrial/commercial soil remediation objectives for inhalation pathway for construction workers and the carbazole concentration exceeded the TACO Tier 1 soil remediation objectives for the soil component of groundwater exposure route for sites with Class I groundwater. Therefore, offsite soil has been impacted by this LUST Incident. MACTEC also collected soil samples on the subject property. Shallow soil samples collected on the east side of Mississippi Street across from the offsite LUST incident at Building 3216 were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, MACTEC concludes that the offsite LUST incident at Building 3216 has not affected the subject property.
- Offsite LUST Incident, Building 3511: PNA concentrations in soil samples collected along the east side of Mississippi Street across from the offsite LUST incident at Building 3511 were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, MACTEC concludes that the offsite LUST incident at Building 3511 has not affected the subject property.
- Onsite UST at 3134 Montana Ave: BTEX and PNA concentrations in soil samples collected the suspected heating oil UST at 3134 Montana Ave were below TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Therefore, it appears that this UST and the petroleum product it may have contained have not affected the subject property.
- IR Site 2 - Forrestal Village Landfill (Onsite): Methane was detected in one (1) of the twenty (20) soil-gas vents installed around the onsite Forrestal Village Landfill. The soil-gas vent in which methane was detected, GV-16, is adjacent to the southwest corner of the landfill. Previous methane testing conducted by the Navy also indicated a subsurface methane detection at the

northwest corner of the Forrestal Village Landfill near the residential building 4228. Based upon the methane testing data as collected by the Navy and MACTEC, MACTEC concludes that methane from the Forrestal Village Landfill may potentially affect the subject property.

- IR Site 3 - Supplyside Landfill (Offsite): Supplyside Landfill is located offsite, west of the boundary of the subject property. Methane was not detected in the five (5) gas vents installed east of the Skokie Ditch, east of the Supplyside Landfill. Therefore, MACTEC concludes that methane from the Supplyside Landfill, if any has been produced, has not affected the subject property.
- IR Sites 18 & 20 – Monazite Sand & Radium-Contaminated Soil Areas: A former monazite sand storage area and an area of radium contaminated soil are present on Supplyside, near Buildings 3214 and 3215. Although this site is west of the boundary of the subject property, the proximity of this site to the proposed housing units warranted Phase II ESA investigation activities. MACTEC performed three phases of radiological surveys east of Mississippi Street. During each survey, elevated gamma radiation levels in near-surface soil samples were detected during screening using hand-held instruments and in laboratory analysis of samples. Therefore, MACTEC concludes that the radioactive material has impacted portions of Forrestal Village east of Mississippi Street.
- Buildings 3028G, 3156D, and 3160D: Surficial soil samples collected immediately adjacent to onsite Buildings 3028G, 3156D, and 3160D did not exhibit lead concentrations above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Since previous sampling conducted by the Navy indicated lead concentrations, which were above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers at these locations, and the exact location of these previous samples were not reported, MACTEC cannot make any definite conclusions regarding the lead concentrations in these surficial soil locations.

5.2 Mainside

- Quarters D, K, I, and Building 64: Of the sixteen (16) surficial soil samples collected immediately adjacent to Quarters D, K, I, and 64, fifteen (15) exhibited lead concentrations above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Based upon the age of these buildings, the source of these elevated lead concentrations is probably lead-based paint used on the exterior surfaces of these structures.

5.3 Hospital Cove

- Buildings 202H, 204H, and 209H: Of the seven (7) surficial soil samples collected immediately adjacent to Quarters 202H, 204H, and 209, six (6) exhibited lead concentrations above the TACO Tier 1 soil remediation objectives for residential property use and for construction workers. Based upon the age of these buildings, the source of these elevated lead concentrations is probably the lead-based paint used on the exterior surfaces of these structures.

5.4 Other Environmental Conditions

- Residences in Forrestal Village, Nimitz Village, Mainside, and Hospital Cove: MACTEC reviewed previous radon testing results which indicated buildings in each of these areas had radon levels which exceeded the US Environmental Protection Agency action level of 4 pCi

(picoCuries). Therefore, MACTEC concludes that radon levels exceeding the US Environmental Protection Agency action level of 4 pCi may exist in housing at the subject property.

- Based upon the Navy's verbal indication concerning the transite and other ACM in topsoil at Forrestal Village, Nimitz Village, and Halsey Village, MACTEC concludes that ACM is present in soils at the subject property.

MACTEC's recommendations based upon this information are presented in the following section.

6.0 RECOMMENDATIONS

Based upon the conclusions presented in Section 5.0, MACTEC recommends the following actions for the subject property:

6.1 Forrestal Village

- Onsite LUST at Building 2710 (Citgo Station): MACTEC does not recommend any further activity for this location. However, MACTEC recommends that continual remediation and monitoring of the LUST site as performed by the Navy be monitored by Forest City.
- Offsite LUST Incident, Building 3216B: MACTEC does not recommend any further action at this location.
- Offsite LUST Incident, Building 3511: MACTEC does not recommend any further action at this location.
- Onsite UST at 3134 Montana Ave: The Navy reported that this UST has been removed and that no release from the UST was observed. However, the Navy also reported that approximately 200 gallons of product were released from storage in an aboveground storage tank, pending disposal by the tank removal contractor during the removal activities. The Navy indicated that the tank removal contractor will clean up the spill and collect confirmatory samples. MACTEC recommends that those sample results be requested and evaluated by Forest City to verify that this spilled area has been adequately remediated. Otherwise, MACTEC does not recommend any further action at this location.

IR Site 2 - Forrestal Village Landfill (Onsite): The Navy's regional Environmental Manager has verbally indicated that a passive methane venting system is in place and will be upgraded by the Navy who plans also to install a new surficial soil over the landfill cap at the Forrestal Village Landfill. MACTEC recommends that Forest City monitor the upgrades to the passive venting system and installation of the landfill cap. Otherwise, MACTEC does not recommend any further action at this location. Because the recently detected methane (in GV-16) is on the south side of the Forrestal Village Landfill which will be at some distance from the newly constructed housing units, and based on the information provided by the Navy indicating that it is planning to upgrade the existing passive venting system to capture methane produced on the south side of the landfill, MACTEC does not believe the methane detected presents a risk to future housing occupants.

- IR Site 3 - Supplside Landfill (Offsite): MACTEC does not recommend any further action at this location.

IR Sites 18 & 20 - Monazite Sand & Radium-Contaminated Soil Areas: Based upon the findings of the radiological assessment surveys, the locations identified with elevated gamma readings and sample results above screening levels will be excluded from the Naval property leased to the joint venture. The Navy's regional Environmental Manager has verbally indicated that the Navy will remediate the locations identified with elevated radiological levels. Once these areas are remediated, they will be released to become part of the Naval property leased to the joint venture. MACTEC understands that the Navy will fence off the areas of Forrestal Village where greater-than-background concentrations of radioactive material have been detected to preclude easy

personnel access. As with most types and concentrations of radioactive material, humans must come in contact with, and/or close proximity to, the material to have a significant health risk posed by the material. So long as the subject areas remain fenced to preclude easy access, and assuming that the material is not spread outside of the fenced areas by wind or water runoff, MACTEC believes that the radioactive material inside of the fenced areas poses little health risk to nearby residents and workers.

- Surficial soil with lead at Buildings 3028G, 3156D, and 3160D: MACTEC recommends that gridded sampling be conducted to verify that lead concentrations at these locations are below the TACO Tier 1 residential soil remediation objectives. Current plans are for the gridded sampling to be performed by MACTEC as part of the site development activities. In the event that the gridded sampling indicates the presence of lead-contaminated soils, the current plan is for the soil to be remediated by excavation and offsite disposal.

6.2 Mainside

- Quarters D, K, I, and Building 64: MACTEC recommends remediation to remove the lead-contaminated soils at these locations. In lieu of soil remediation, TACO regulations allow for the installation and maintenance of an engineered barrier (3 feet of clean soil or asphalt or concrete cover) over the affected areas and construction worker caution should construction workers be working in the area and be potentially exposed to the impacted soil. Further, unless these buildings will be demolished, MACTEC recommends abatement or encapsulation of any remaining lead-based paint on the structures. Current plans are for the remediation by excavation and offsite disposal of the lead-contaminated soils at these locations by the demolition contractor as part of the site development activities.

6.3 Hospital Cove

- Buildings 202H, 204H, and 209H: MACTEC recommends remediation to remove the lead-contaminated soils at these locations. In lieu of soil remediation, TACO regulations would require the installation and maintenance of an engineered barrier (3 feet of clean soil or asphalt or concrete cover) over the affected areas and construction worker caution should construction workers be working in the area and be potentially exposed to the impacted soil. Further, unless these buildings will be demolished, MACTEC recommends abatement or encapsulation of any remaining lead-based paint on the structures. Current plans are for the remediation by excavation and offsite disposal of the lead-contaminated soils at these locations by the demolition contractor as part of the site development activities.

6.4 Other Environmental Conditions

- Residences in Forrestal Village, Nimitz Village, Mainside, and Hospital Cove: MACTEC recommends additional radon sampling of occupied units. If elevated radon levels are detected in currently or future-occupied housing, then MACTEC recommends installation of an appropriate radon mitigation system in each structure that reduces radon levels to below the US Environmental Protection Agency action level of 4 pCi. Current plans are for the radon mitigation to be handled by Forest City as a development activity.
- Based upon the Navy's verbal indication concerning the transite and other ACM in topsoil at Forrestal Village, Nimitz Village, and Halsey Village, MACTEC believes that the ACM is only an environmental concern during site grading activities when this ACM may be disturbed.

Therefore, MACTEC recommends monitoring during the site development activities during which disturbance of these soils is likely. Soils removed from these areas must be properly disposed as asbestos containing materials (ACM).

7.0 REFERENCES

- *MACTEC Engineering and Consulting, Inc., Final Report of Phase I Environmental Site Assessment, Former Naval Air Station Glenview, Naval Region Midwest Family Housing Privatization*, MACTEC Project Number 3205050472.03, dated October 31, 2005.
- *Environmental Baseline Survey, Public / Private Venture Housing Privatization, Naval Station Great Lakes, Great Lakes, Illinois* prepared for NAVAL Facilities Engineering Command, Southern Division, dated March 2004.
- *Environmental Assessment*, prepared for Department of the Navy, Naval Facilities, Engineering Field Division South, dated December 2004.
- Personal interview with Blayne Kirsch, NAVFAC Midwest Environmental Director, May 11, 2005.
- *Project Plans and Report, Final Cover Study, Forrestal Landfill, Great Lakes, Illinois*, prepared for Department of the Navy, Engineering Field Activity, Midwest Environmental Department, prepared by Clayton Group Services, dated May 5, 2004.
- *Final Delivery Order Closure Report, Leaking Underground Storage Tank Relative Risk Ranking Sampling, 18 Sites, Great Lakes Naval Training Center, Great Lakes, Illinois*, prepared for Department of the Navy, Naval Training Center, Environmental Department Building 1A, 201 Decatur Avenue, Great Lakes, Illinois, prepared by TolTest, Inc., April 2003.
- *Corrective Action Plan, Naval Training Center Bldg. 2710, Great Lakes, Illinois*, dated October 2, 1998, prepared by Beling Consultants,
- *Ninth Quarterly Monitoring Report, Building 2710 (NEX Mini-Mart) Naval Station, Great Lakes, Illinois*, dated August 9, 2004, prepared by TolTest, Inc.
- *Final Underground Storage Tank Closure Report, Building 3216, Naval Station, Great Lakes, Illinois*, dated October 6, 2003, prepared by TolTest, Inc.
- *Final Delivery Order Completion Report, Forrestal Landfill Boundary Delineation (IR Site 2), Demolition Debris Disposal Area (IR Site 13G), Naval Training Center, Great Lakes, Illinois*, dated September 2000 prepared by TolTest, Inc.
- *Final Delivery Order Completion Report, Sampling and Analytical Testing of Volatile Organic Compounds at Forrestal Landfill Naval Training Center (NTC), Great Lakes, Illinois*, dated April 2003, prepared by TolTest, Inc.
- *Existing Conditions Investigation and Proposed Modifications to Landfill Cover System, Supplside Landfil , Naval Station Great Lakes, Illinois*, dated August 2003, prepared by Versar, Inc.
- *Draft Work Plan for Radiological Remediation and Final Status Survey at Great Lakes Naval Training Center, Great Lakes, Illinois*, dated November 21, 2001, prepared by Cabrera Services, Inc.
- *Lead Management Plan, Forrestal Wherry 14 Unit Apartments, Naval Training Center (NTC), Great Lakes, Illinois* (date unknown), prepared by the Department of Navy.
- *Lead Management Plan, Forrestal/Hospital Capehart, Naval Training Center (NTC), Great Lakes, Illinois* (date unknown), prepared by the Department of Navy.

- *Lead-Based Paint Risk Assessment Mainside Village – OPQ 1911, Great Lakes NTC, Great Lakes, Illinois*, dated March 3, 2005 and prepared by GLE Associates, Inc.
- *Lead-Based Paint Risk Assessment Mainside Village – OPQ 1918, Great Lakes NTC, Great Lakes, Illinois*, dated March 3, 2005 and prepared by GLE Associates, Inc.
- *Lead Management Plan, Brick Row Naval Training Center (NTC), Great Lakes, Illinois* dated May 1998, prepared by the Department of Navy.
- *Lead-Based Paint Risk Assessment Hospitalside Village – 1909, Great Lakes NTC, Great Lakes, Illinois*, dated March 3, 2005, prepared by GLE Associates, Inc.
- *Comprehensive Environmental Survey, Building 204H, Naval Station Great Lakes, Great Lakes, Illinois*, dated November 12, 2004, prepared by Versar, Inc.
- *Comprehensive Environmental Survey, Fish Bowls, Buildings 205A, 205B, 206A, 206B, 207A, 207B, 208A, 209A, and 209B, Naval Station Great Lakes, Great Lakes, Illinois*, dated November 12, 2004, prepared by Versar, Inc.

TABLES

TABLE 1
SUMMARY OF PHASE II SCOPE OF WORK
NAVSTA GREAT LAKES - FORRESTAL VILLAGE, MAINSIDE, HOSPITAL COVE
 Great Lakes, Illinois

SITE NAME OR IDENTIFIER	AREA OF CONCERN OR ENVIRONMENTAL LOCATION	KNOWN OR POTENTIAL SOURCE OF CONTAMINATION OR ENVIRONMENTAL CONCERN	KNOWN OR POTENTIAL TYPE OF CONTAMINATION	MEDIA KNOWN OR POTENTIALLY IMPACTED	IMPETUS FOR PHASE II ACTIVITIES	PHASE II SCOPE OF WORK	
						Number/Depth of Borings/Samples	Sample Analysis
PHASE II SCOPE OF WORK BASED UPON DOCUMENT REVIEW							
UST SITES							
LUST Site - CITGO Gas Sta.	Bldg. 2710	(2) Former 15,000-Gal. Gasoline & (1) Former 12,000-Gal. Gasoline USTs	Gasoline	Soil & GW	BTEX in Soils & GW (also MTBE) above TACO Tier 1 Residential Objectives. Verification of Migration of Contamination Impacted to Housing Areas.	4 GP borings to 8' bgs. 1 sample per boring for analysis based upon PID readings. 1 groundwater sample from one boring for analysis.	BTEX & MTBE.
LUST Site	Bldg. 3216	(2) Former 4,000 Gasoline & Diesel USTs	Gasoline & Diesel	Soil	Benzene and 2,4-dinitrostoluene exceeded TACO Tier 1 Residential Remediation Objectives at 2.5 bgs below product dispenser island. Verification of Closure Not Available.	4 GP borings to 4 feet deep. 1 sample per boring based upon PID readings. 2 borings at dispenser island and 2 at western edge of housing area.	BTEX & SVOCs.
LUST Site	Bldg. 3511	(1) 4,000-gal & (1) 20,000-gal diesel USTs & (1) 20,000-gallon gasoline UST	Gasoline & Diesel	Soil	PNAs exceeded TACO Tier 1 Residential Remediation Objectives to 10' bgs. Verification of Closure Not Available.	2 GP borings to 10' bgs on western edge of housing. 1 sample per boring based upon PID readings.	BTEX & PNAs.
UST Site	Vacant Property Between 3132 and 3138 Montana St. per NAVFAC representatives	(1) 500-gal. UST	Assumed Heating Oil	Soil	No Previous Sampling Conducted per NAVFAC.	3 borings to 10' bgs and 1 boring to 12' bgs adjacent to the UST location. 1 sample per boring for analysis.	BTEX & PNAs.
IR SITES OR SITES DIRECTLY ASSOCIATED WITH IR SITES							
IR Site 2	Forrestal Village Landfill	Landfill	Methane	Soil Gas	Previous Methane Testing Data Indicated Intermittent Presence of Methane. Verification of No Methane Impact to Housing Areas.	20 GP borings to 10 feet deep around FV north, east, and southern boundaries. Install 1" gas probes w/ 5' screens in each boring.	In-Situ Methane.
IR Site 3	Supplyside Landfill	Landfill	Methane	Soil Gas	Verification of No Methane Impact to Housing Areas.	5 GP borings to 16 feet deep along western edge of Navy Prop boundary east of landfill. Install 1" gas probes with 10' screens in each boring.	In-Situ Methane.
IR Site 16	Monazite Sand Area	Storage of radioactive Monazite sand	Thorium-232 and daughters	Soil & Sediment	Verification of No Radiation Impact to Housing Areas.	Radiation Survey & 5 Soil Samples & 25 Sediment Samples from Shackle Ditch.	Radioactivity. Isotopic Thorium by Alpha Spectroscopy and Natural Uranium and Thorium Decay Series.
IR Site 20	Radium Contaminated Soil Area	Storage of recycled mat's containing radium	Radium	Soil & Sediment	Verification of No Radiation Impact to Housing Areas.		
LEAD-BASED PAINT IN SOIL SITES AT FORRESTAL VILLAGE							
NA	3150D Texas Court	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	1 Surficial Soil Sample	Lead.
NA	3150D Texas Court	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	1 Surficial Soil Sample	Lead.
NA	3025G Wyoming	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	1 Surficial Soil Sample	Lead.
LEAD-BASED PAINT IN SOIL SITES AT MAINSIDE							
NA	Quarters D	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	2 Surficial Soil Samples.	Lead.
NA	Quarters I	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	7 Surficial Soil Samples.	Lead.
NA	Quarters K	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	2 Surficial Soil Samples.	Lead.
NA	Quarters 64	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	5 Surficial Soil Samples.	Lead.
LEAD-BASED PAINT IN SOIL SITES AT HOSPITAL COVE							
NA	Bldg 202H	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	5 Surficial Soil Samples.	Lead.
NA	Bldg 204H	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	1 Surficial Soil Sample.	Lead.
NA	Bldg 209H	Exterior Lead-based Paint	Lead	Soil	Lead in Surface Soils Were Above TACO Tier 1 Residential Objectives.	1 Surficial Soil Sample.	Lead.

NOTES:

UST
 BTEX
 MTBE
 PNAs
 SVOCs
 lpg
 Gal
 Underground Storage Tank
 Benzene, Toluene, Ethylbenzene, and Xylenes
 Methyl Tertiary-Butyl Ether
 Polynuclear aromatic hydrocarbons
 Semi-Volatile Organic Compounds
 Below Ground Surface
 Gallon

IR
 TACO
 BLDG
 NAVFAC
 PID
 GW
 Installation Restoration
 Tiered Approach to Corrective Action Objectives
 Building
 Naval Facilities
 Photoionization Detector
 Groundwater

**TABLE 2
SUMMARY OF SOIL ANALYTICAL DATA
BUILDING 2710 LUST SITE**

**NAVSTA GREAT LAKES - FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID		SB-11	SB-12	SB-13	SB-14	TACO	TACO	TACO	TACO
Sample Depth (feet)		4.5	6.5	6.0	6.5	Tier I	Tier I	Tier I	Tier I
Sample Date		6/23/05	6/23/05	6/23/05	6/23/05	Residential Objectives (1)	Class I Groundwater Objectives (2)	Class II Groundwater Objectives (2)	Construction Worker Objectives (3)
Parameter	Units								
BTEX & MTBE									
Benzene	mg/kg	ND	ND	ND	ND	0.8 (inh)	0.03	0.17	2.2 (inh)
Toluene	mg/kg	0.0028	ND	ND	0.0043	650 (inh)	12	29	42 (inh)
Ethylbenzene	mg/kg	ND	ND	ND	ND	400 (inh)	13	19	58 (inh)
Xylenes (Total)	mg/kg	ND	ND	ND	ND	320 (inh)	150	150	320 (inh)
Methyl tert-butyl ether	mg/kg	ND	ND	ND	ND	780 (ing)	0.32	0.32	140 (inh)

Notes:

- (1): The most stringent soil remediation objectives of the ingestion (ing) and inhalation (inh) routes for residential properties, 35 IAC 742 Appendix B, Table A
 (2): The soil remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I and Class II groundwater, 35 IAC 742 Appendix B, Table A
 (3): The most stringent construction worker objective for the ingestion (ing) or inhalation (inh) routes, 35 IAC 742 Appendix B, Table B
 ing ingestion
 inh inhalation
 mg/kg Milligram per kilogram
 ND Non-detect at laboratory detection limit
 NE Not established by the Illinois Environmental Protection Agency
BOLD Laboratory Analytical Detection

Prepared by: DEN
 Checked by: MSR

TABLE 3
SUMMARY OF GROUNDWATER ANALYTICAL DATA
BUILDING 2710 LUST SITE

NAVSTA GREAT LAKES - FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS

Sample ID		SB13GW	TACO Tier I
Sample Date		6/23/05	Class I Groundwater Objectives (1)
Parameter	Units		
BTEX			
Benzene	mg/L	ND	0.005
Toluene	mg/L	ND	1.0
Ethylbenzene	mg/L	ND	0.7
Xylenes (Total)	mg/L	ND	10.0
Methyl tert-butyl ether	mg/L	ND	0.07

Notes:

(1) EPA TACO (35 IAC 742 Appendix B, Table E)
Class I Groundwater Remediation Objective.

mg/L Milligram per liter

ND Non-detect at laboratory detection limit

Prepared by: DEN
Checked by: MSR

**TABLE 4
SUMMARY OF SOIL ANALYTICAL DATA
BUILDING 3216 LUST SITE**

NAVSTA GREAT LAKES - FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS

Sample ID Sample Depth (feet)		SB-3 0-2	SB-4 0-2	SB-5 2-4	SB-6 2-4	TACO Tier I Residential Objectives (1)	TACO Tier I Class I Groundwater Objectives (2)	TACO Tier I Class II Groundwater Objectives (2)	TACO Tier I Construction Worker Objectives (3)	TACO Background Values Within MSA (4)
Parameter	Units	6/22/05	6/22/05	6/22/05	6/22/05					
BTEX										
Benzene	mg/kg	ND	ND	ND	2.3	0.8 (inh)	0.03	0.17	2.2 (inh)	NE
Toluene	mg/kg	ND	ND	ND	0.011	650 (inh)	12	29	42 (inh)	NE
Ethylbenzene	mg/kg	ND	ND	ND	5.4	400 (inh)	13	19	58 (inh)	NE
Xylenes (Total)	mg/kg	ND	ND	ND	4.4	320 (inh)	150	150	320 (inh)	NE
POLYNUCLEAR AROMATIC HYDROCARBONS										
Acenaphthene	mg/kg	ND	ND	ND	1.6	4,700 (ing)	570	2,900	120,000 (ing)	NE
Acenaphthylene	mg/kg	ND	ND	ND	0.48	NE	NE	NE	NE	NE
Anthracene	mg/kg	ND	ND	ND	0.66	23,000 (ing)	12,000	59,000	610,000 (ing)	NE
Benzo(a)anthracene	mg/kg	ND	0.068	ND	ND	0.9 (ing)	2	8	170 (ing)	1.8
Benzo(a)pyrene	mg/kg	ND	0.043	ND	ND	0.09 (ing)	8	82	17 (ing)	2.1
Benzo(b)fluoranthene	mg/kg	ND	0.064	ND	ND	0.9 (ing)	5	25	170 (ing)	2
Benzo(g,h,i)perylene	mg/kg	ND	0.039	ND	ND	NE	NE	NE	NE	NE
Benzo(k)fluoranthene	mg/kg	ND	0.061	ND	ND	9 (ing)	49	250	1,700 (ing)	1.7
Chrysene	mg/kg	ND	0.068	ND	0.061	88 (ing)	160	800	17,000 (ing)	2.7
Dibenzo(a,h)anthracene	mg/kg	ND	ND	ND	ND	0.09 (ing)	2	7.6	17 (ing)	0.42
Fluoranthene	mg/kg	ND	0.093	ND	0.32	3,100 (ing)	4,300	21,000	82,000 (ing)	NE
Fluorene	mg/kg	ND	ND	ND	3.9	3,100 (ing)	560	2,800	82,000 (ing)	NE
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	0.9 (ing)	14	69	170 (ing)	1.6
Naphthalene	mg/kg	ND	ND	ND	3.7	170 (inh)	12	18	1.8 (inh)	NE
Phenanthrene	mg/kg	ND	0.043	ND	8	NE	NE	NE	NE	NE
Pyrene	mg/kg	ND	0.15	ND	0.73	2,300 (ing)	4,200	21,000	61,000 (ing)	NE
SEMI-VOLATILES										
2-Methylnaphthalene	mg/kg	ND	ND	ND	8.9	NE	NE	NE	NE	NE
Bis(2-ethylhexyl)phthalate	mg/kg	0.26	ND	ND	ND	46 (ing)	3600	31,000	4,100 (ing)	NE
Carbazole	mg/kg	ND	ND	ND	0.97	32 (ing)	0.6	2.8	6,200 (ing)	NE
Dibenzofuran	mg/kg	ND	ND	ND	2.2	NE	NE	NE	NE	NE

Notes:

- (1): The most stringent soil remediation objectives of the ingestion (ing) and inhalation (inh) routes for residential properties, 35 IAC 742 Appendix B, Table A
 - (2): The soil remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I and Class II groundwater, 35 IAC 742 Appendix B, Table A
 - (3): The most stringent construction worker objective for the ingestion (ing) or inhalation (inh) routes, 35 IAC 742 Appendix B, Table B
 - (4): The background soil concentration in Counties Within Metropolitan Statistical Areas, IEPA Publication, Background Carcinogenic PAH
- ing ingestion
inh inhalation
mg/kg Milligram per kilogram
ND Non-detect at laboratory detection limit
NE Not established by the Illinois Environmental Protection Agency
BOLD Laboratory Analytical Detection
BOLD + HIGHLIGHT Laboratory Analytical Detection that exceeds TACO Tier 1 Residential Remediation Objectives.

Prepared by: DEN
Checked by: MSR

TABLE 5
SUMMARY OF SOIL ANALYTICAL DATA
BUILDING 3511 LUST SITE

NAVSTA GREAT LAKES - FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS

Sample ID Sample Depth (feet) Sample Date Parameter	Units	SB-1 11-12 6/22/05	SB-2 11-12 6/22/05	TACO Tier I Residential Objectives (1)	TACO Tier I Class I Groundwater Objectives (2)	TACO Tier I Class II Groundwater Objectives (2)	TACO Tier I Construction Worker Objectives (3)	TACO Background Values Within MSA (4)
POLYNUCLEAR AROMATIC HYDROCARBONS								
Acenaphthene	mg/kg	ND	ND	4,700 (ing)	570	2,900	120,000 (ing)	NE
Acenaphthylene	mg/kg	ND	ND	NE	NE	NE	NE	NE
Anthracene	mg/kg	ND	ND	23,000 (ing)	12,000	59,000	610,000 (ing)	NE
Benzo(a)anthracene	mg/kg	ND	ND	0.9 (ing)	2	8	170 (ing)	1.8
Benzo(a)pyrene	mg/kg	ND	ND	0.09 (ing)	8	82	17 (ing)	2.1
Benzo(b)fluoranthene	mg/kg	ND	ND	0.9 (ing)	5	25	170 (ing)	2.0
Benzo(g,h,i)perylene	mg/kg	ND	ND	NE	NE	NE	NE	NE
Benzo(k)fluoranthene	mg/kg	ND	ND	9 (ing)	49	250	1,700 (ing)	1.7
Chrysene	mg/kg	ND	ND	88 (ing)	160	800	17,000 (ing)	2.7
Dibenzo(a,h)anthracene	mg/kg	ND	ND	0.09 (ing)	2	7.6	17 (ing)	0.42
Fluoranthene	mg/kg	ND	ND	3,100 (ing)	4,300	21,000	82,000 (ing)	NE
Fluorene	mg/kg	ND	ND	3,100 (ing)	560	2,800	82,000 (ing)	NE
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	0.9 (ing)	14	69	170 (ing)	1.6
Naphthalene	mg/kg	ND	ND	170 (inh)	12	18	1.8 (inh)	NE
Phenanthrene	mg/kg	0.03	ND	NE	NE	NE	NE	NE
Pyrene	mg/kg	ND	ND	2,300 (ing)	4,200	21,000	61,000 (ing)	NE

Notes:

- (1): The most stringent soil remediation objectives of the ingestion (ing) and inhalation (inh) routes for residential properties, 35 IAC 742 Appendix B, Table A
 - (2): The soil remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I and Class II groundwater, 35 IAC 742 Appendix B, Table A
 - (3): The most stringent construction worker objective for the ingestion (ing) or inhalation (inh) routes, 35 IAC 742 Appendix B, Table B
 - (4): The background soil concentration in Counties Within Metropolitan Statistical Areas, IEPA Publication, Background Carcinogenic PAH
- ing ingestion
inh inhalation
mg/kg Milligram per kilogram
ND Non-detect at laboratory detection limit
NE Not established by the Illinois Environmental Protection Agency
BOLD Laboratory Analytical Detection

Prepared by: DEN
Checked by: MSR

**TABLE 6
SUMMARY OF SOIL ANALYTICAL DATA
3134 MONTANA AVENUE UST SITE**

**NAVSTA GREAT LAKES - FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID Sample Depth (feet)		SB-7 5.0	SB-8 3.5	SB-9 2.5	SB-10 6.0	TACO Tier I Residential Objectives (1)	TACO Tier I Class I Groundwater Objectives (2)	TACO Tier I Class II Groundwater Objectives (2)	TACO Tier I Construction Worker Objectives (3)	TACO Background Values Within MSA (4)
Parameter	Sample Date Units	6/23/05	6/23/05	6/23/05	6/23/05					
BTEX										
Benzene	mg/kg	ND	ND	ND	ND	0.8 (inh)	0.03	0.17	2.2 (inh)	NE
Toluene	mg/kg	ND	ND	ND	ND	650 (inh)	12	29	42 (inh)	NE
Ethylbenzene	mg/kg	ND	ND	ND	ND	400 (inh)	13	19	58 (inh)	NE
Xylenes (Total)	mg/kg	ND	ND	ND	ND	320 (inh)	150	150	320 (inh)	NE
POLYNUCLEAR AROMATIC HYDROCARBONS										
Acenaphthene	mg/kg	ND	ND	ND	ND	4,700 (ing)	570	2,900	120,000 (ing)	NE
Acenaphthylene	mg/kg	ND	ND	ND	ND	NE	NE	NE	NE	NE
Anthracene	mg/kg	ND	0.031	ND	ND	23,000 (ing)	12,000	59,000	610,000 (ing)	NE
Benzo(a)anthracene	mg/kg	ND	0.099	ND	ND	0.9 (ing)	2	8	170 (ing)	1.8
Benzo(a)pyrene	mg/kg	ND	0.089	ND	ND	0.09 (ing)	8	82	17 (ing)	2.1
Benzo(b)fluoranthene	mg/kg	ND	0.11	0.031	ND	0.9 (ing)	5	25	170 (ing)	2
Benzo(g,h,i)perylene	mg/kg	ND	0.056	0.026	ND	NE	NE	NE	NE	NE
Benzo(k)fluoranthene	mg/kg	ND	0.072	ND	ND	9 (ing)	49	250	1,700 (ing)	1.7
Chrysene	mg/kg	ND	0.11	ND	ND	88 (ing)	160	800	17,000 (ing)	2.7
Dibenzo(a,h)anthracene	mg/kg	ND	ND	ND	ND	0.09 (ing)	2	7.6	17 (ing)	0.42
Fluoranthene	mg/kg	ND	0.22	ND	ND	3,100 (ing)	4,300	21,000	82,000 (ing)	NE
Fluorene	mg/kg	ND	ND	ND	ND	3,100 (ing)	560	2,800	82,000 (ing)	NE
Indeno(1,2,3-cd)pyrene	mg/kg	ND	0.059	0.026	ND	0.9 (ing)	14	69	170 (ing)	1.6
Naphthalene	mg/kg	ND	ND	ND	ND	170 (inh)	12	18	1.8 (inh)	NE
Phenanthrene	mg/kg	ND	0.17	ND	ND	NE	NE	NE	NE	NE
Pyrene	mg/kg	ND	0.17	ND	ND	2,300 (ing)	4,200	21,000	61,000 (ing)	NE

Notes:

- (1): The most stringent soil remediation objectives of the ingestion (ing) and inhalation (inh) routes for residential properties, 35 IAC 742 Appendix B, Table A
- (2): The soil remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I and Class II groundwater, 35 IAC 742 Appendix B, Table A
- (3): The most stringent construction worker objective for the ingestion (ing) or inhalation (inh) routes, 35 IAC 742 Appendix B, Table B
- (4): The background soil concentration in Counties Within Metropolitan Statistical Areas, IEPA Publication, Background Carcinogenic PAH

ing ingestion
inh inhalation

mg/kg Milligram per kilogram

ND Non-detect at laboratory detection limit

NE Not established by the Illinois Environmental Protection Agency

BOLD Laboratory Analytical Detection

Prepared by: DEN
Checked by: MSR

TABLE 7
SUMMARY OF METHANE MONITORING - IR SITE #2
FORRESTAL VILLAGE LANDFILL

NAVSTA Great Lakes
Great Lakes, Illinois

	Well Depth	Well Screen Depth	Length of Well Screen				
	(feet below	(feet below	Above Water Table	Date	Methane	Carbon Dioxide	Oxygen
Well ID	ground surface)	ground surface)	(feet)	Monitored	(%)	(%)	(%)
GV1	9.72	4.72 - 9.72	4.74	7/11/2005	0	0.1 - 0.4	19.8 - 20.7
GV2	10.63	5.63 - 10.63	-1.62	7/11/2005	0	0.1	20.6 - 20.8
GV3	10.48	5.48 - 10.48	2.24	7/11/2005	0	5.3 - 9.1	12.2 - 15.6
GV4	10.04	5.04 - 10.04	-0.64	7/8/2005	0	0.2 - 1.6	19.2 - 21.1
GV5	10	5.0 - 10.0	0.61	7/8/2005	0	0.1 - 0.3	20.9 - 21.5
GV6	9.97	4.97 - 9.97	0.29	7/11/2005	0	0 - 3.4	18.2 - 21.1
GV7	9.98	4.98 - 9.98	-1.02	7/11/2005	0	0.2 - 1.7	18.9 - 20.4
GV8	10.17	5.17 - 10.17	-0.76	7/11/2005	0	0.2 - 0.3	20.3 - 20.5
GV9	9.93	4.93 - 9.93	-0.26	7/11/2005	0	0.1 - 0.2	20.3 - 20.5
GV10	10.04	5.04 - 10.04	0.02	7/11/2005	0	0.2 - 0.7	19.6 - 20.5
GV11	10.11	5.11 - 10.11	1.07	7/11/2005	0	0.1 - 0.7	19.2 - 20.7
GV12	10.05	5.05 - 10.05	1.69	7/11/2005	0	0.6 - 0.9	19.3 - 20.1
GV13	10.02	5.02 - 10.02	3.84	7/11/2005	0	0.1 - 5.7	15.9 - 20.7
GV14	10.01	5.01 - 10.01	5	7/11/2005	0	1.0 - 10.6	11.5 - 19.1
GV15	11.03	6.03 - 11.03	0.04	7/11/2005	0	0.9 - 5.4	13.3 - 20.5
GV16	9.99	4.99 - 9.99	1.31	7/11/2005	1.5 - 12.4	5.3 - 28.0	0.0 - 17.6
GV17	10.04	5.04 - 10.04	1.92	7/11/2005	0	1.7 - 5.0	17.2 - 19.9
GV18	10.44	5.44 - 10.44	4.73	7/11/2005	0	0.6 - 14.9	8.7 - 20.9
GV19	10.46	5.46 - 10.46	0.61	7/11/2005	0	2.1 - 10.6	5.1 - 18.5
GV20	9.95	4.95 - 9.95	3.79	7/11/2005	0	0.2 - 1.2	19.1 - 21.0

Notes:

- 1) The wells were monitored for methane, carbon dioxide and oxygen using a GEM™ 2000 Landfill Gas Extraction Monitor.
- 2) Length of monitoring ranged from 1 to 15 minutes.

Prepared by: DEN
Checked by: MSR

TABLE 8
SUMMARY OF METHANE MONITORING - IR SITE #3
SUPPLYSIDE LANDFILL

NAVSTA Great Lakes
Great Lakes, Illinois

	Well Depth	Well Screen Depth	Length of Well Screen				
	(feet below	(feet below	Above Water Table	Date	Methane	Carbon Dioxide	Oxygen
Well ID	ground surface)	ground surface)	(feet)	Monitored	(%)	(%)	(%)
GV21	15.74	5.74 - 15.74	0.07	7/8/2005	0	0 - 0.5	20.0 - 21.2
GV22	15.47	5.47 - 15.47	0.32	7/8/2005	0	0.1 - 2.5	18.4 - 21.4
GV23	15.8	5.8 - 15.8	1.71	7/8/2005	0	0.4 - 3.1	16.6 - 20.8
GV24	15.73	5.73 - 15.73	1.75	7/8/2005	0	0.4 - 2.3	18.9 - 21.0
GV25	15.67	5.67 - 15.67	-1.8	7/8/2005	0	0 - 0.1	21.2 - 21.3

Notes:

- 1) The wells were monitored for methane, carbon dioxide and oxygen using a GEM™ 2000 Landfill Gas Extraction Monitor.
- 2) Length of monitoring ranged from 1 to 15 minutes.

Prepared by: DEN
Checked by: MSR

**TABLE 9
SUMMARY OF RADIOANALYTICAL DATA - SURFACE SOIL SAMPLES**

**NAVSTA GREAT LAKES
FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID	D-28	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		1.050	0.180	0.030	
Thorium 230		0.680	0.130	0.010	
Thorium 232		0.980	0.170	0.020	
Sample ID	D-29	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		6.250	0.670	0.030	
Thorium 230		1.420	0.200	0.020	
Thorium 232		6.130	0.650	0.020	
Sample ID	D-30	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		22.600	2.700	0.040	
Thorium 230		3.280	0.450	0.020	
Thorium 232		22.300	2.600	0.040	
Sample ID	D-31	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		1.220	0.210	0.060	
Thorium 230		0.710	0.150	0.040	
Thorium 232		1.210	0.210	0.030	
Sample ID	D-32	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		1.040	0.170	0.040	
Thorium 230		1.420	0.210	0.010	
Thorium 232		0.880	0.150	0.020	

Notes:

(1): Samples D-32 is a soil sample presumed to be representative of background radioactivity

(2): Data summary based upon preliminary laboratory results

pCi/g = pico-Curies per gram

MDC = minimum detectable concentration, as determined using instrument performance only

BOLD

Results are greater than the MDC

Sample Qualifiers

J Result is greater than the sample detection limit but less than the stated reporting limit

Prepared By: jwl
Checked By: mpm

TABLE 10
SUMMARY OF RADIOANALYTICAL DATA - SKOKIE DITCH SEDIMENT SAMPLES

**NAVSTA GREAT LAKES
FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID	S-001	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.272	0.073	0.033	J
Thorium 230		0.500	0.100	0.020	J
Thorium 232		0.295	0.075	0.011	J
Sample ID	S-001 DUP	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.313	0.082	0.032	J
Thorium 230		0.520	0.110	0.020	
Thorium 232		0.255	0.072	0.023	J
Sample ID	S-002	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.404	0.087	0.027	J
Thorium 230		0.730	0.130	0.010	
Thorium 232		0.396	0.086	0.010	J
Sample ID	S-003	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.429	0.092	0.024	J
Thorium 230		0.780	0.130	0.020	
Thorium 232		0.378	0.085	0.010	J
Sample ID	S-004	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.650	0.120	0.030	
Thorium 230		0.520	0.110	0.020	
Thorium 232		0.720	0.130	0.020	

TABLE 10
SUMMARY OF RADIOANALYTICAL DATA - SKOKIE DITCH SEDIMENT SAMPLES

NAVSTA GREAT LAKES
FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS

Sample ID	S-005	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.490	0.120	0.070	J
Thorium 230		0.790	0.160	0.030	
Thorium 232		0.480	0.110	0.030	J
Sample ID	S-005 DUP	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.470	0.120	0.060	J
Thorium 230		0.810	0.160	0.030	
Thorium 232		0.590	0.130	0.030	
Sample ID	S-006	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.880	0.160	0.030	
Thorium 230		0.770	0.140	0.020	
Thorium 232		0.650	0.130	0.030	
Sample ID	S-007	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.730	0.130	0.020	
Thorium 230		0.780	0.140	0.010	
Thorium 232		0.640	0.120	0.010	
Sample ID	S-008	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.520	0.110	0.020	
Thorium 230		0.560	0.110	0.020	
Thorium 232		0.500	0.110	0.010	
Sample ID	S-009	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.770	0.190	0.070	
Thorium 230		0.690	0.180	0.050	
Thorium 232		0.950	0.220	0.020	

TABLE 10
SUMMARY OF RADIOANALYTICAL DATA - SKOKIE DITCH SEDIMENT SAMPLES

**NAVSTA GREAT LAKES
FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID	S-010	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.540	0.130	0.040	
Thorium 230		0.550	0.130	0.020	
Thorium 232		0.390	0.100	0.030	J
Sample ID	S-011	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.560	0.110	0.030	
Thorium 230		0.750	0.140	0.020	
Thorium 232		0.520	0.110	0.010	
Sample ID	S-012	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.371	0.088	0.048	J
Thorium 230		0.760	0.130	0.030	
Thorium 232		0.364	0.083	0.029	J
Sample ID	S-013	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.480	0.100	0.030	J
Thorium 230		0.830	0.140	0.020	
Thorium 232		0.432	0.094	0.018	J
Sample ID	S-014	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.700	0.140	0.040	
Thorium 230		0.510	0.110	0.030	
Thorium 232		0.700	0.140	0.020	
Sample ID	S-015	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.810	0.150	0.040	
Thorium 230		1.080	0.180	0.030	
Thorium 232		0.870	0.150	0.020	

**TABLE 10
SUMMARY OF RADIOANALYTICAL DATA - SKOKIE DITCH SEDIMENT SAMPLES**

**NAVSTA GREAT LAKES
FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID	S-016	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.414	0.097	0.034	J
Thorium 230		0.780	0.140	0.020	
Thorium 232		0.450	0.100	0.020	J
Sample ID	S-017	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.610	0.130	0.060	
Thorium 230		1.060	0.180	0.030	
Thorium 232		0.580	0.120	0.030	
Sample ID	S-017 DUP	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.510	0.110	0.040	
Thorium 230		1.060	0.170	0.020	
Thorium 232		0.610	0.120	0.010	
Sample ID	S-018	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.590	0.120	0.030	
Thorium 230		1.150	0.180	0.020	
Thorium 232		0.500	0.100	0.020	J
Sample ID	S-019	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.480	0.100	0.030	J
Thorium 230		0.660	0.120	0.020	
Thorium 232		0.433	0.096	0.011	J
Sample ID	S-020	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.369	0.087	0.048	J
Thorium 230		0.570	0.110	0.030	
Thorium 232		0.352	0.081	0.029	J

TABLE 10
SUMMARY OF RADIOANALYTICAL DATA - SKOKIE DITCH SEDIMENT SAMPLES

**NAVSTA GREAT LAKES
FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID	S-021	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.490	0.100	0.030	J
Thorium 230		0.790	0.140	0.010	
Thorium 232		0.530	0.110	0.020	
Sample ID	S-022	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.288	0.086	0.042	J
Thorium 230		0.570	0.130	0.030	
Thorium 232		0.420	0.100	0.030	J
Sample ID	S-023	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.650	0.130	0.030	
Thorium 230		1.120	0.180	0.020	
Thorium 232		0.670	0.130	0.020	
Sample ID	S-024	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.436	0.094	0.031	J
Thorium 230		0.810	0.140	0.020	
Thorium 232		0.436	0.093	0.020	J

TABLE 10
SUMMARY OF RADIOANALYTICAL DATA - SKOKIE DITCH SEDIMENT SAMPLES

**NAVSTA GREAT LAKES
FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID	S-025	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.231	0.067	0.033	J
Thorium 230		0.510	0.100	0.020	
Thorium 232		0.304	0.076	0.021	J
Sample ID	S-026	Result	Total Uncertainty (+/- 2 sigma)	MDC	Qualifier
Sample Depth (feet)	0 - 0.5				
Sample Date	9/6/05				
Units	pCi/g				
Method	A-01-R-MOD (alpha Spectroscopy)				
Parameter					
RADIOLOGICALS					
Thorium 228		0.930	0.160	0.030	
Thorium 230		1.060	0.170	0.020	
Thorium 232		0.770	0.140	0.030	

Notes:

- (1): Samples S-001, -002, & -003 are sediment samples presumed to be representative of background radioactivity
(2): Data summary based upon preliminary laboratory results

pCi/g = pico-Curies per gram

MDC = minimum detectable concentration, as determined using instrument performance only

BOLD Results are greater than the MDC

Sample Qualifiers

J Result is greater than the sample detection limit but less than the stated reporting limit

Prepared By: jwl
Checked By: mpm

**TABLE 11
SUMMARY OF SOIL ANALYTICAL DATA
SURFICIAL SOIL LEAD AREAS**

**NAVSTA GREAT LAKES - FORRESTAL VILLAGE
GREAT LAKES, ILLINOIS**

Sample ID	3160D	3156D	3028G	TACO	TACO	TACO	TACO	TACO
Sample Depth (feet)	0.2	0.2	0.2	Tier I	Tier I	Tier I	Tier I	Background
Sample Date	6/23/05	6/23/05	6/23/05	Residential	Class I Groundwater	Class II Groundwater	Construction Worker	Values
Parameter	Units			Objectives (1)	Objectives (2)	Objectives (2)	Objectives (3)	Within MSA (4)
METALS								
Lead	mg/kg	170	110	87	400 (ing)	NE	NE	400 (ing)
								36

Notes:

- (1): The most stringent soil remediation objectives of the ingestion (ing) and inhalation (inh) routes for residential properties, 35 IAC 742 Appendix B, Table A
 (2): The soil remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I and Class II groundwater, 35 IAC 742 Appendix B, Table A
 (3): The most stringent construction worker objective for the ingestion (ing) or inhalation (inh) routes, 35 IAC 742 Appendix B, Table B
 (4): The concentrations of inorganic chemicals in background soil for Counties Within Metropolitan Statistical Areas, 35 IAC 742 Appendix A, Table G
 ing ingestion
 mg/kg Milligram per kilogram
 NE Not established by the Illinois Environmental Protection Agency
BOLD Laboratory Analytical Detection

Prepared by: DEN
Checked by: MSR

**TABLE 12
SUMMARY OF SOIL ANALYTICAL DATA - SURFICIAL LEAD SOIL SAMPLES**

**NAVSTA GREAT LAKES
MAINSIDE AREA
GREAT LAKES, ILLINOIS**

Sample ID Sample Depth (feet)		D-1 0 - 0.5	D-2 0 - 0.5	I-1 0 - 0.5	I-2 0 - 0.5	I-3 0 - 0.5	I-4 0 - 0.5	I-5 0 - 0.5	I-6 0 - 0.5	I-7 0 - 0.5	TACO Tier 1 Residential Objectives (1)	TACO Tier 1 Class 1 Groundwater Objectives (2)	TACO Tier 1 Construction Worker Objectives (3)	TACO Background Values Within MSA (4)
Sample Date	Units	7/29/05	7/29/05	7/29/05	7/29/05	7/29/05	7/29/05	7/29/05	7/29/05	7/29/05				
Parameter	Units													
METALS														
Lead	mg/kg	1,200	1,400	3,100	5,600	5,300	4,300	13,000	8,500	1,800	400 (ing)	NE	400 (ing)	36
TCLP - METALS														
Lead	mg/L	NA	NA	2.2	NA	NA	NA	NA	4.6	NA	NE	0.0075	NE	NE

Sample ID Sample Depth (feet)		K-1 0 - 0.5	K-2 0 - 0.5	64-1 0 - 0.5	64-2 0 - 0.5	64-3 0 - 0.5	64-4 0 - 0.5	64-5 0 - 0.5			TACO Tier 1 Residential Objectives (1)	TACO Tier 1 Class I Groundwater Objectives (2)	TACO Tier 1 Construction Worker Objectives (3)	TACO Background Values Within MSA (4)
Parameter	Sample Date	Units	7/29/05	7/29/05	7/29/05	7/29/05	7/29/05	7/29/05						
METALS														
Lead		mg/kg	7,000	7,300	520	1,000	97	530	600		400 (ing)	NE	400 (ing)	36
TCLP - METALS														
Lead		mg/L	9.6	NA	NA	5.4	NA	NA	NA		NE	0.0075	NE	NE

Notes:

- (1): The most stringent soil remediation objectives of the ingestion (ing) and inhalation (inh) routes for residential properties, 35 IAC 742 Appendix B, Table A
 (2): The soil remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I and Class II groundwater, 35 IAC 742 Appendix B, Table A
 (3): The most stringent construction worker objective for the ingestion (ing) or inhalation (inh) routes, 35 IAC 742 Appendix B, Table B
 (4): The concentrations of inorganic chemicals in background soil for Counties Within Metropolitan Statistical Areas, 35 IAC 742 Appendix A, Table G
 ing ingestion
 mg/kg Milligram per kilogram
 ND Non-detect at laboratory detection limit
 NE Not established by the Illinois Environmental Protection Agency
BOLD Laboratory Analytical Detection
BOLD + HIGHLIGHT Laboratory Analytical Detection that exceeds TACO Tier 1 Residential Remediation Objectives.

Prepared by: DEN
Checked by: MSR

**TABLE 13
SUMMARY OF SOIL ANALYTICAL DATA - SURFICIAL LEAD SOIL SAMPLES**

**NAVSTA GREAT LAKES
HOSPITAL COVE AREA
GREAT LAKES, ILLINOIS**

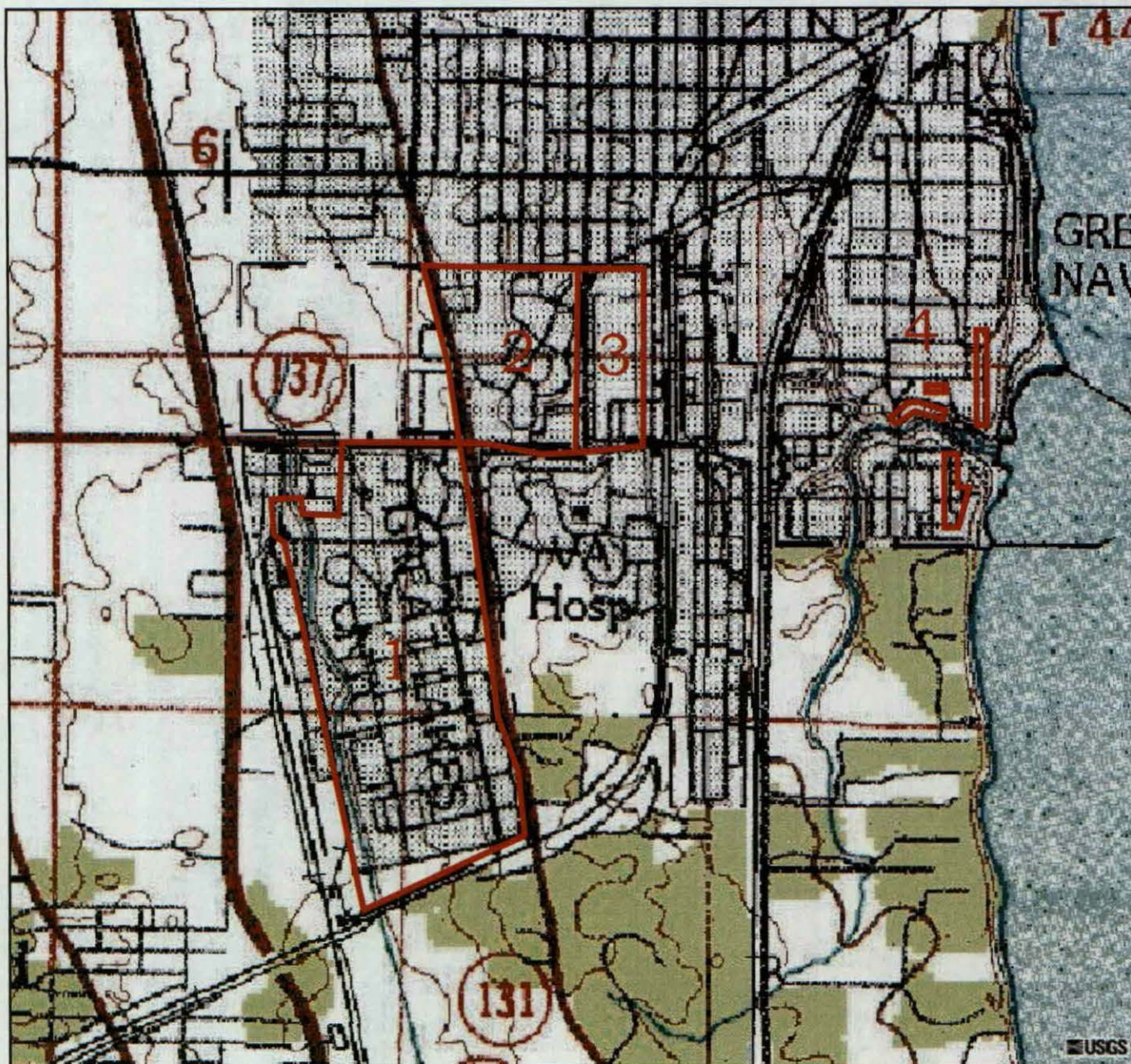
Sample ID	Sample Depth (feet)	Sample Date	Units	202H-1 0 - 0.5	202H-2 0 - 0.5	202H-3 0 - 0.5	202H-4 0 - 0.5	202H-5 0 - 0.5	204H-1 0 - 0.5	209-1 0 - 0.5	TACO Tier I Residential Objectives (1)	TACO Tier I Class I Groundwater Objectives (2)	TACO Tier I Construction Worker Objectives (3)	TACO Background Values Within MSA (4)
Parameter														
METALS														
Lead	mg/kg			1,300	14,000	750	2,100	1,300	1,100	290	400 (ing)	NE	400 (ing)	36
TCLP - METALS														
Lead	mg/L			NA	7	NA	NA	NA	NA	NA	NE	0.0075	NE	NE

Notes:

- (1): The most stringent soil remediation objectives of the ingestion (ing) and inhalation (inh) routes for residential properties, 35 IAC 742 Appendix B, Table A
 (2): The soil remediation objective for the Soil Component of the Groundwater Ingestion Exposure Route for Class I and Class II groundwater, 35 IAC 742 Appendix B, Table A
 (3): The most stringent construction worker objective for the ingestion (ing) or inhalation (inh) routes, 35 IAC 742 Appendix B, Table B
 (4): The concentration of inorganic chemicals in background soil for Counties Within Metropolitan Statistical Areas, 35 IAC 742 Appendix A, Table G
 ing Ingestion
 mg/kg Milligram per kilogram
 ND Non-detect at laboratory detection limit
 NE Not established by the Illinois Environmental Protection Agency
BOLD Laboratory Analytical Detection
BOLD + HIGHLIGHT Laboratory Analytical Detection that exceeds TACO Tier 1 Residential Remediation Objectives.

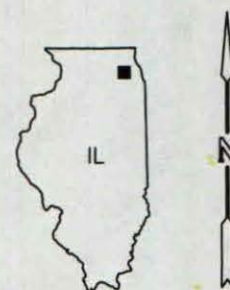
Prepared by: DEN
Checked by: MSR

FIGURES



KEY

- = APPROXIMATE SITE BOUNDARIES
- 1 = FORRESTAL VILLAGE
- 2 = HALSEY VILLAGE
- 3 = NIMITZ VILLAGE
- 4 = SQUIRREL HOLLOW, HOSPITAL COVE, & MAINSIDE



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DRAWN
GAP

PROJECT NUMBER
3205050441.01

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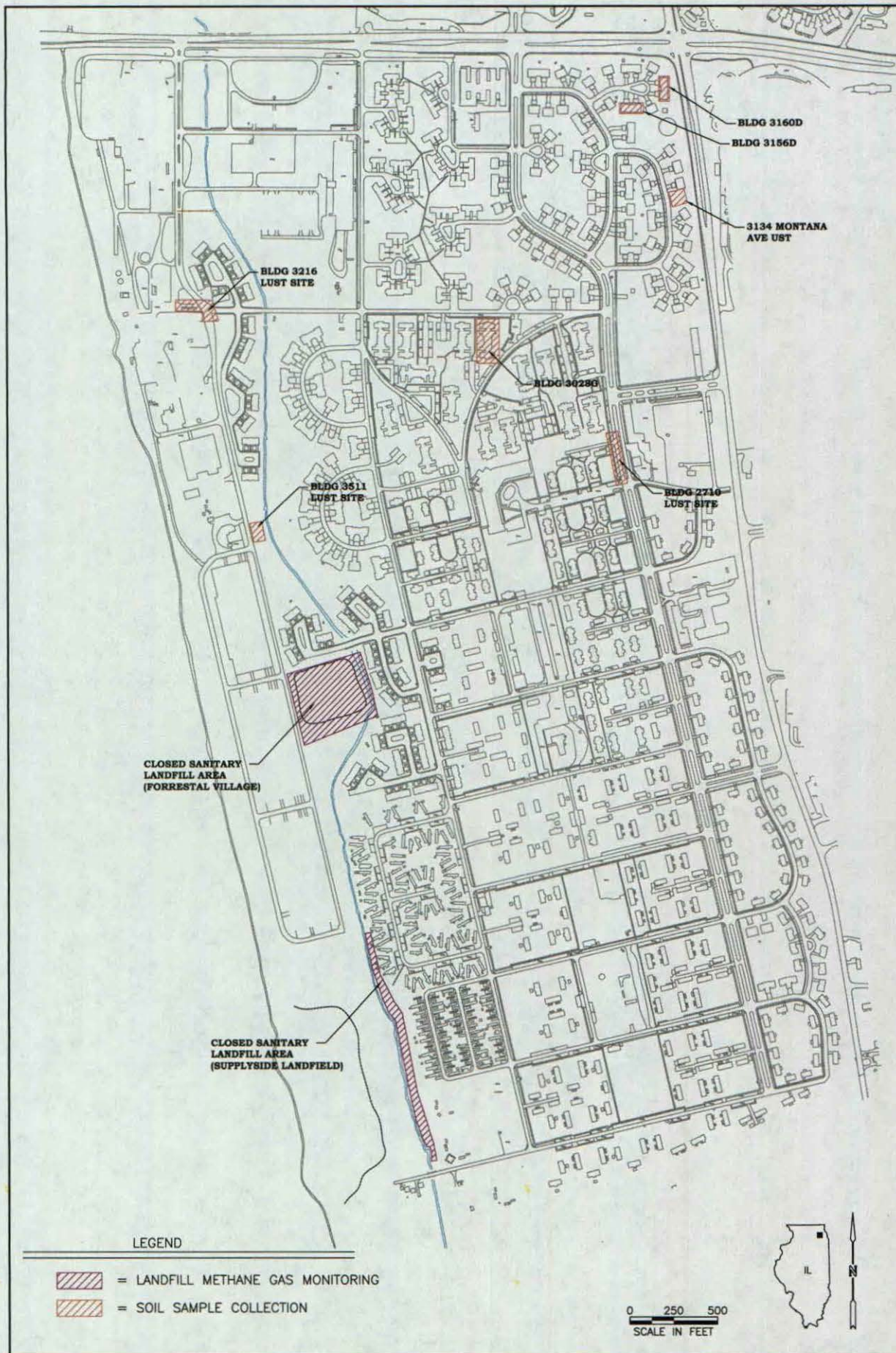
DATE
09/14/05

REVISED DATE

Site Location Map
Navy Property at NAVSTA, Great Lakes
Great Lakes, IL

FIGURE

1



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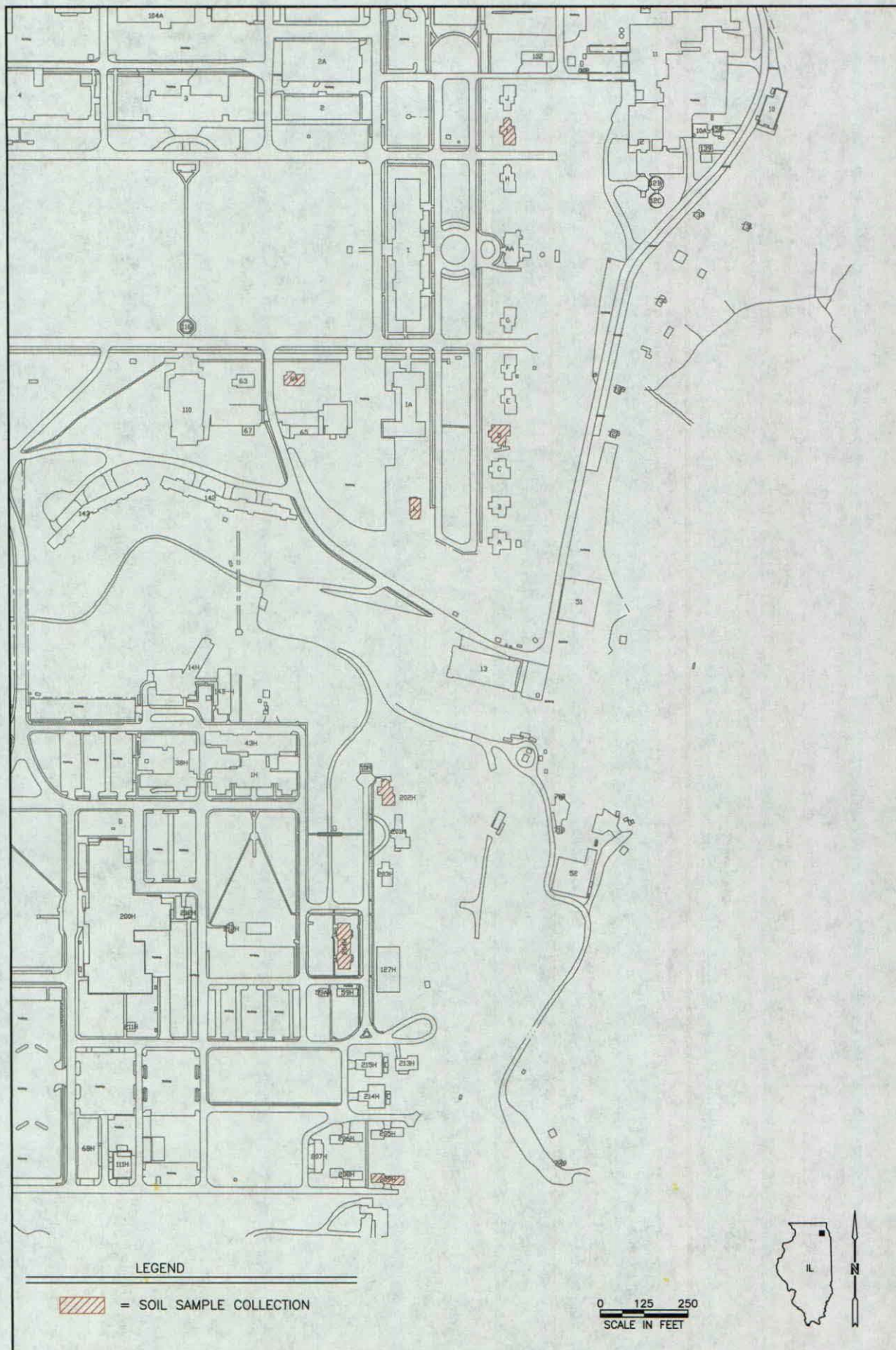
PROJECT NUMBER
3205050441.01

PHASE II ESA INVESTIGATION AREAS
Forrestal Village
Navy Property at Forrestal Village
Great Lakes, IL

APPROVED
AEH

DATE
09/14/05

FIGURE
2
REVISED DATE



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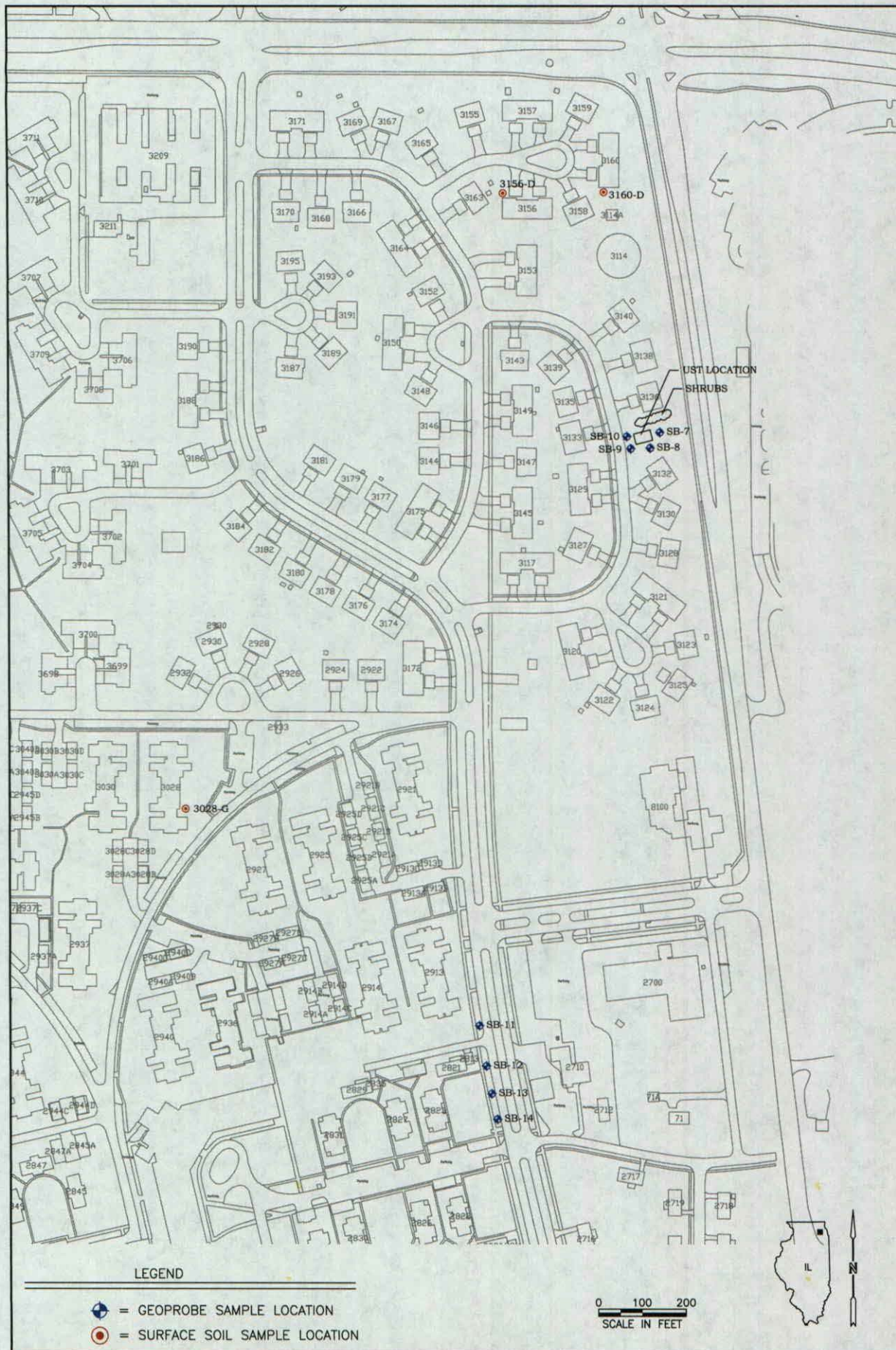
PROJECT NUMBER
3205050441.01

PHASE II ESA INVESTIGATION AREAS
Mainside & Hospital Cove
Navy Property at Mainside & Hospital Cove
Great Lakes, IL

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DATE
09/14/05

FIGURE
3
REVISED DATE





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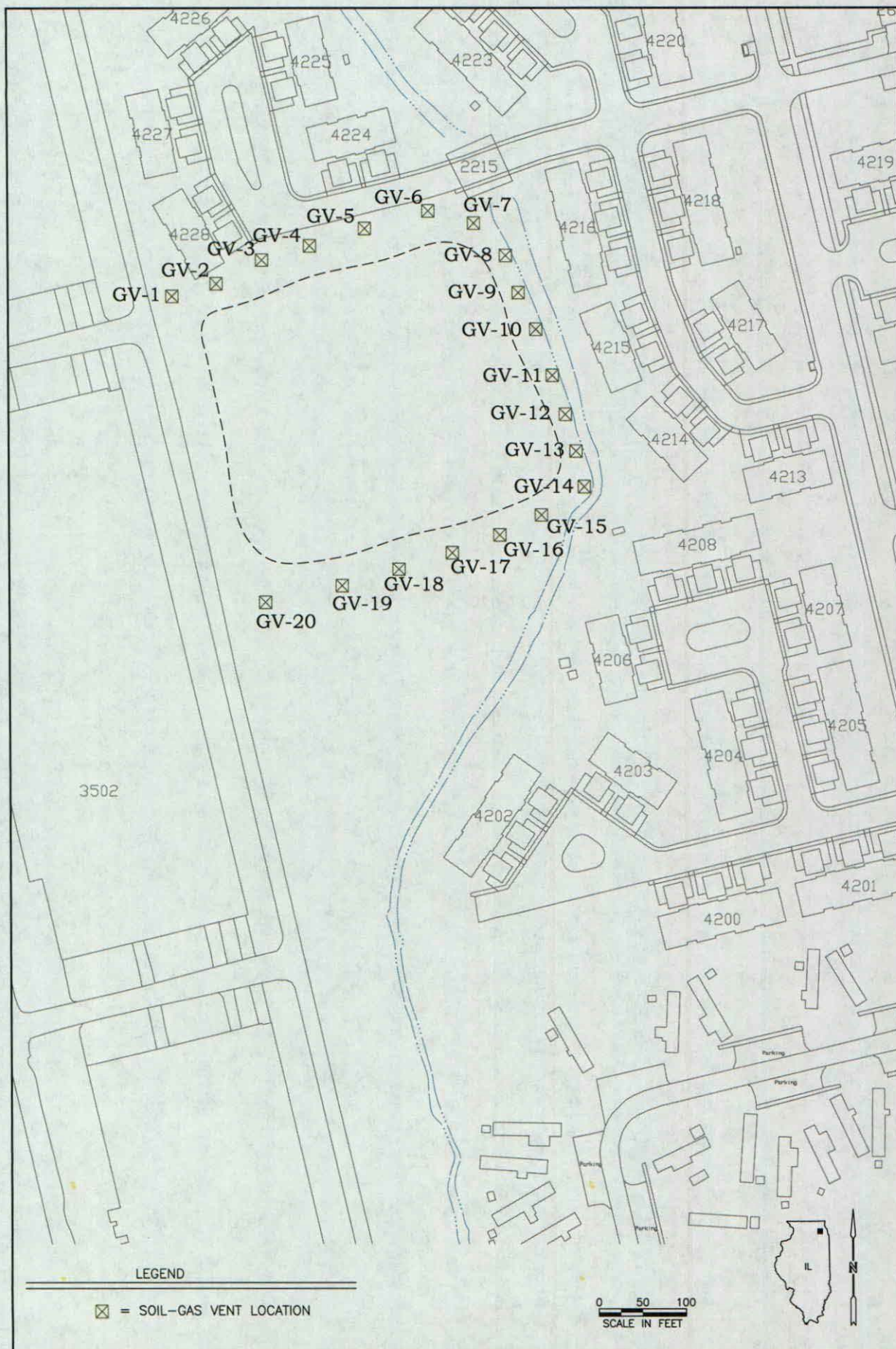
PROJECT NUMBER
3205050441.01

BORING LOCATION PLAN
Buildings 3511 & 3216
Navy Property at Forrestal Village
Great Lakes, IL

APPROVED
AEH

DATE
09/14/05

FIGURE
5
REVISED DATE



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PROJECT NUMBER
3205050441.01

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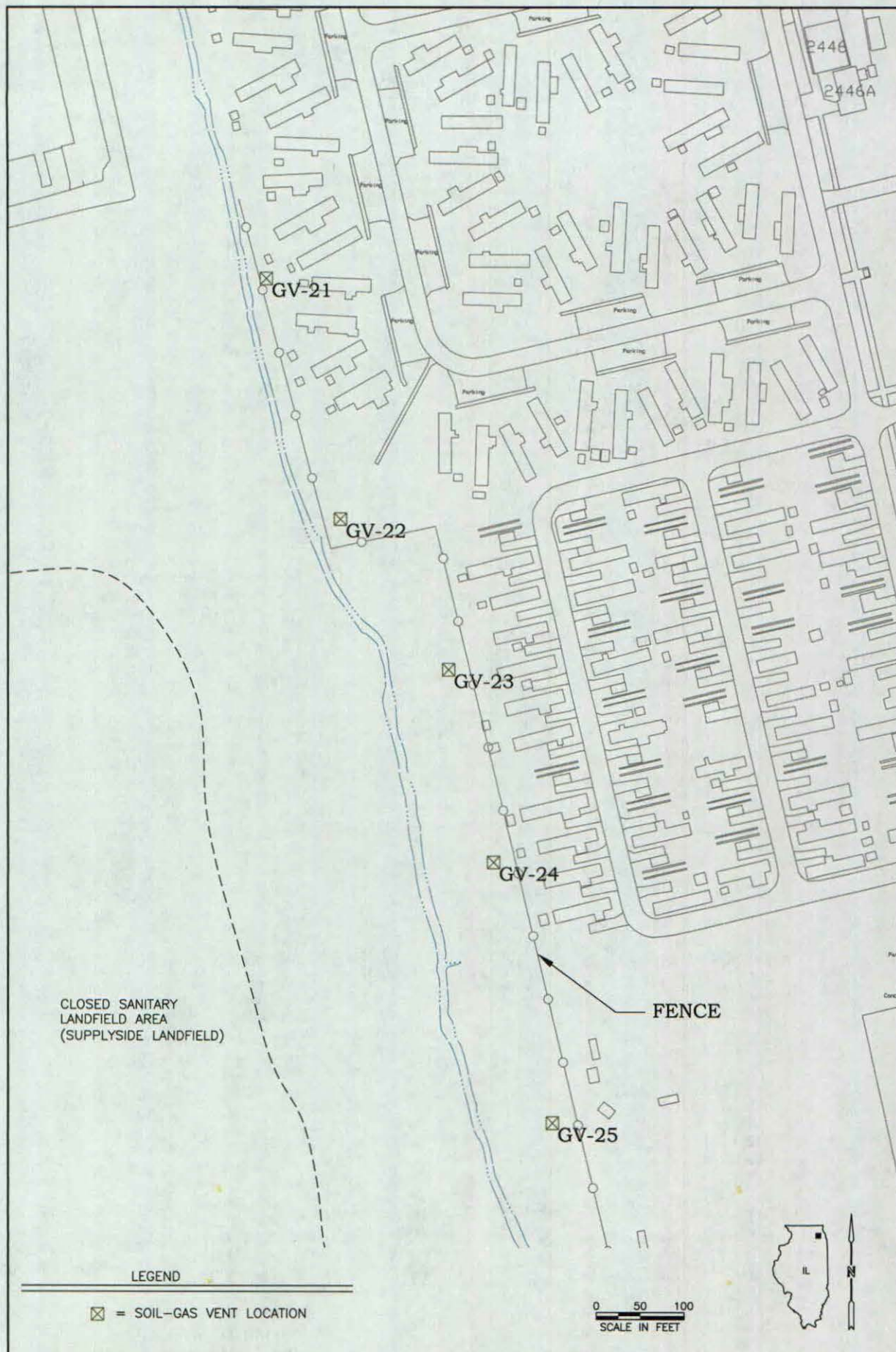
SOIL-GAS VENT LOCATION PLAN
FORRESTAL VILLAGE LANDFILL
Navy Property at Forrestal Village
Great Lakes, IL

DATE
08/24/05

REVISED DATE

FIGURE

6



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PROJECT NUMBER
3205050441.01

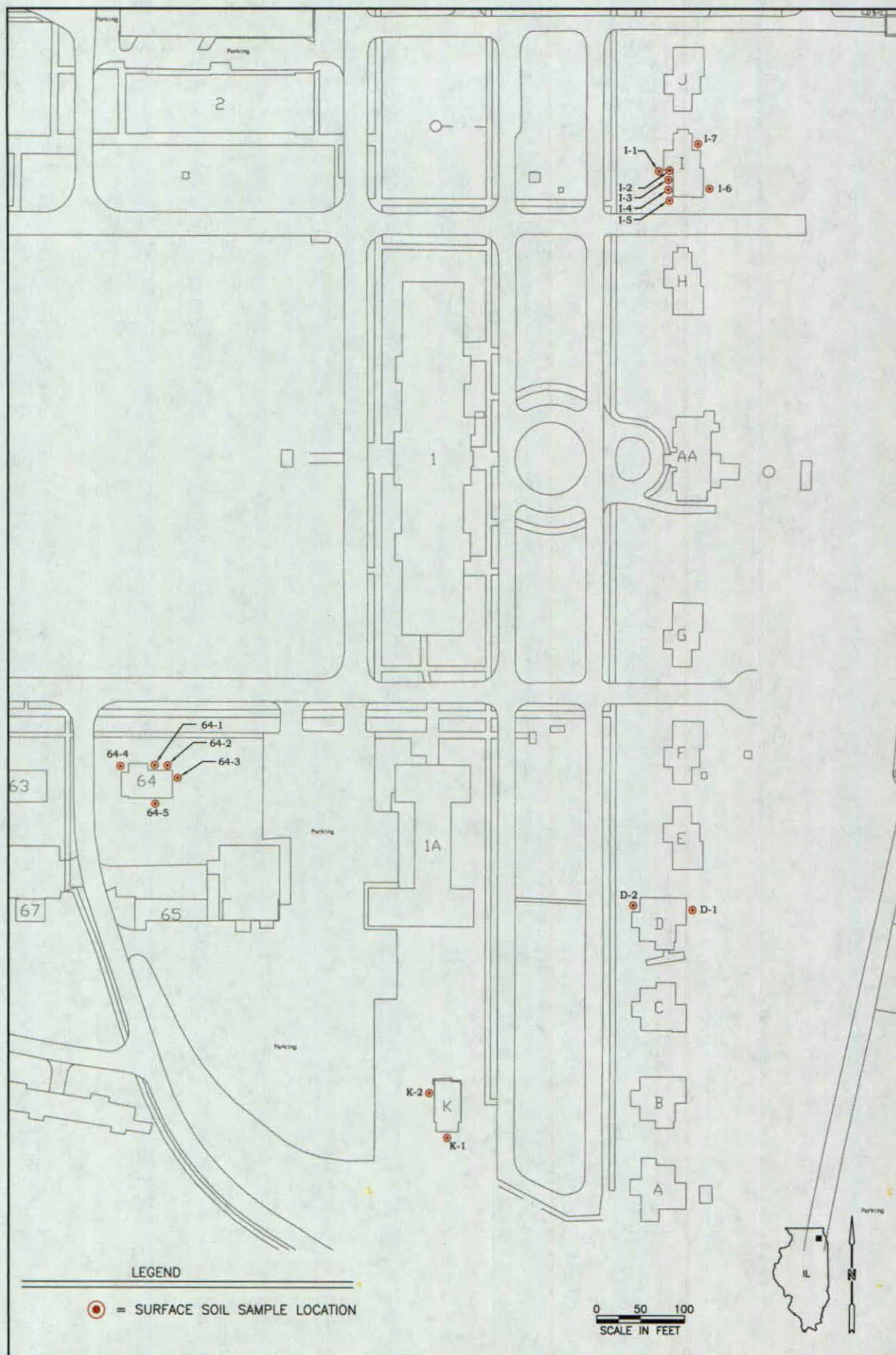
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SOIL-GAS VENT LOCATION PLAN
Supplyside Landfill
Navy Property at Forrestal Village
Great Lakes, IL

DATE
09/14/05

REVISED DATE

FIGURE
7



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PROJECT NUMBER
3205050441.01

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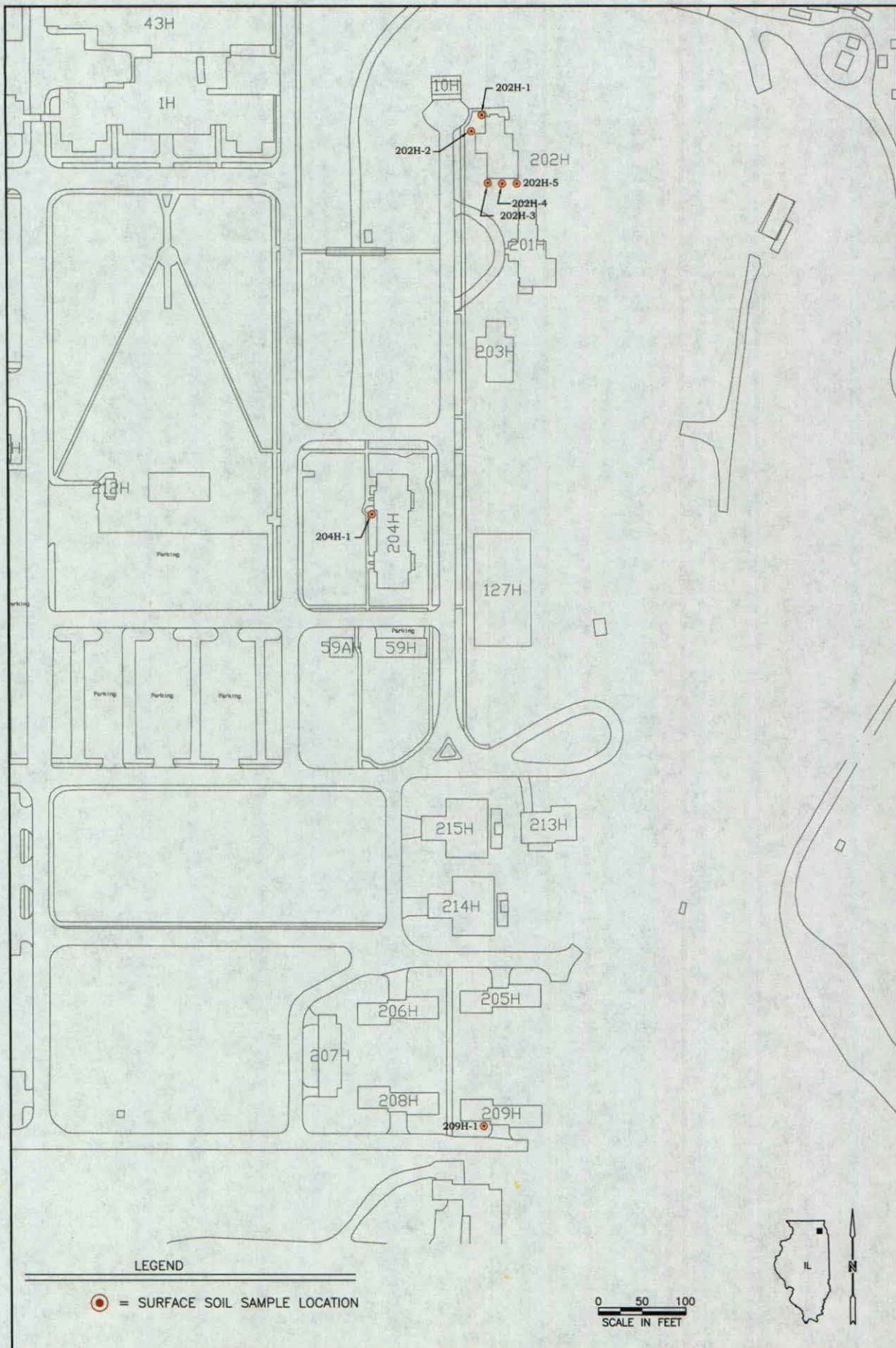
DATE
09/14/05

REVISED DATE

SURFACE SOIL SAMPLE LOCATION PLAN
Quarters D, K, & I & Building 64
Navy Property at Mainside
Great Lakes, IL

FIGURE

8



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DATE
09/14/05

REVISED DATE

SURFACE SOIL SAMPLING PLAN
Buildings 202H, 204H, & 209H
Navy Property at Hospital Cove
Great Lakes, IL

FIGURE

9

Appendix A

Representative Photographs

Site Photographs

Site Name: NAVSTA Great Lakes -
Forrestal Village
Great Lakes, Illinois

Project No: 3205050441
By: MACTEC Engineering and Consulting, Inc.
Date: June 21, 2005



Photo No. 1: View of UST location on Montana Street

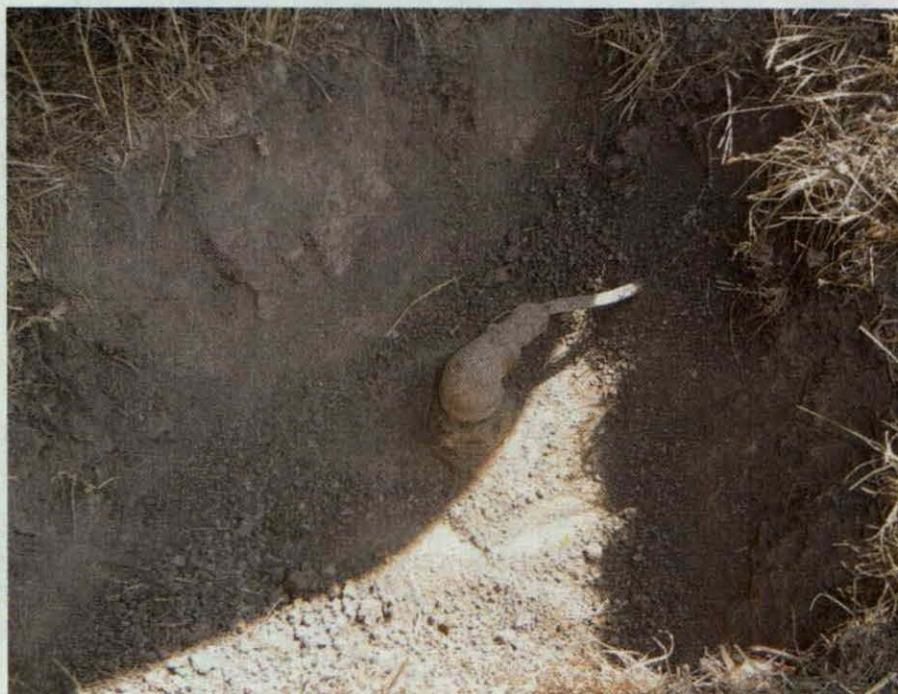


Photo No. 2: UST at Montana Street

Site Photographs

Site Name: NAVSTA Great Lakes -
Forrestal Village
Great Lakes, Illinois

Project No: 3205050441
By: MACTEC Engineering and Consulting, Inc.
Date: June 21, 2005



Photo No. 3: Installing methane monitoring well GV20



Photo No. 4: Placing sand and bentonite in methane monitoring well

Site Photographs

Site Name: NAVSTA Great Lakes -
Forrestal Village
Great Lakes, Illinois

Project No: 3205050441
By: MACTEC Engineering and Consulting, Inc.
Date: May 5, 2005 and July 18, 2005



Photo No. 5: Forrestal Village Landfill showing methane monitoring well

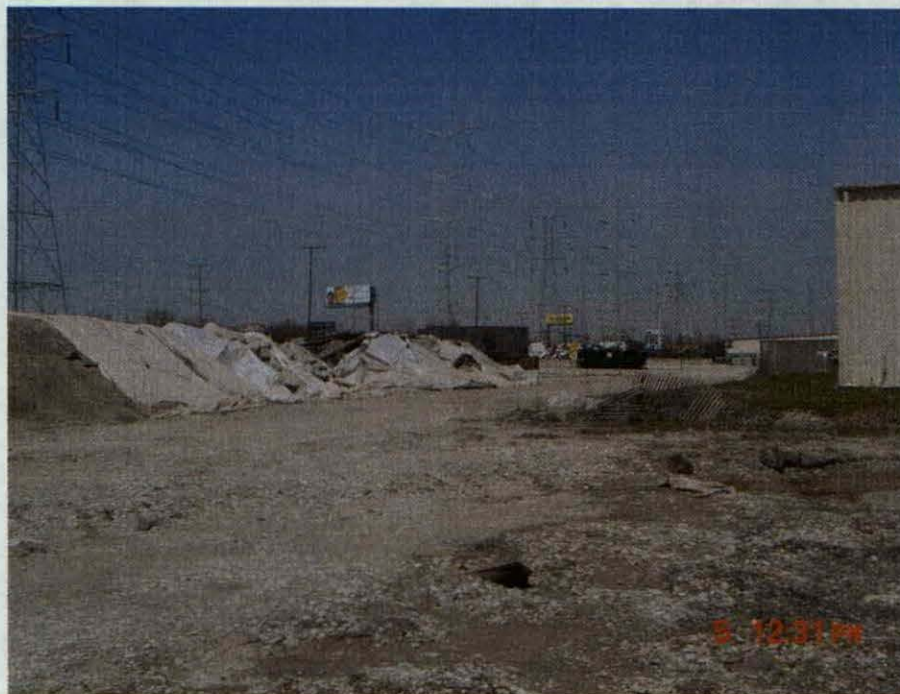


Photo No. 6: Monazite sand area

Site Photographs

Site Name: NAVSTA Great Lakes -
Forrestal Village
Great Lakes, Illinois

Project No: 3205050441
By: MACTEC Engineering and Consulting, Inc.
Date: July 18, 2005 and September 7, 2005



Photo No. 7: Skokie Ditch, looking south



Photo No. 8: Radiation Survey in Skokie Ditch

Site Photographs

Site Name: NAVSTA Great Lakes -
Forrestal Village
Great Lakes, Illinois

Project No: 3205050441
By: MACTEC Engineering and Consulting, Inc.
Date: September 7, 2005



Photo No. 9: Looking north along Skokie Ditch

Appendix B
Test Boring Records



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-1		Great Lakes, IL
DATE:	6/22/2005		
LOGGED BY:	CYY	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA: 2"
TOTAL DEPTH: 12'

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0						
1			0.0	moist	Brownish grey silty clay with sand and gravel	
2						
3			0.2	dry		
4						
5			0.4	dry	Brownish grey silty clay with sand and gravel	
6						
7			0.5	moist		
8						
9			0.2	moist	Grey silty clay with fine sand	
10						
11			0.8*	moist		
12					End of soil boring at 12 feet below ground surface	
13					* Soil sample selected for laboratory analysis	
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-2		Great Lakes, IL
DATE:	6/22/2005		
LOGGED BY:	CYY	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA.: 2"

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

TOTAL DEPTH: 12'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0						
1			1.5	dry	Brownish grey silty clay with coarse sand and gravel	
2						
3			0.9	dry		
4						
5			0.0	dry	Brownish grey silty clay with sand and gravel	
6						
7			0.2	dry		
8						
9			0.4	moist	Grey silty clay with fine sand	
10						
11			0.2*	moist		
12					End of soil boring at 12 feet below ground surface	
13					* Soil sample selected for laboratory analysis	
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-3		Great Lakes, IL
DATE:	6/22/2005		
LOGGED BY:	CYY	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

HOLE DIA: 2"
TOTAL DEPTH: 4'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0						
1			1.0*	dry	Brownish grey silty clay with coarse sand and gravel	
2						
3			0.5	dry		
4					End of soil boring at 4 feet below ground surface	
5					* Soil sample selected for laboratory analysis	
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-4		Great Lakes, IL
DATE:	6/22/2005		
LOGGED BY:	CYY	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA: 2"

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

TOTAL DEPTH: 4'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					FILL: Sand and gravel	
1			10.0*	dry		
2						
3			2.0	dry	Brown silty clay with coarse sand and gravel	
4						
5					End of soil boring at 4 feet below ground surface	
6					* Soil sample selected for laboratory analysis	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-5		Great Lakes, IL
DATE:	6/22/2005		
LOGGED BY:	CYY	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA: 2"

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

TOTAL DEPTH: 4'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0						
1			10.0	dry	Brown silty clay with coarse sand and gravel	
2						
3			12.0*	dry	Brown silty clay with fine sand and gravel	
4						
5					End of soil boring at 4 feet below ground surface	
6					* Soil sample selected for laboratory analysis	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-6		Great Lakes, IL
DATE:	6/22/2005		
LOGGED BY:	CYY	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA: 2"

TOTAL DEPTH: 4'

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0						
1			140	dry	FILL: Sand and gravel	
2					Brown silty clay with fine sand and gravel	
3			423*	dry		
4					End of soil boring at 4 feet below ground surface	
5					* Soil sample selected for laboratory analysis	
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-7		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

HOLE DIA: 2"
TOTAL DEPTH: 10'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0						
1			4.9	dry	Brown to gray sandy soil with some gravel	
2			7.4			
3			12.6		Brownish gray mottled clay with silt and gravel	
4			14.3*			
5			2.8			
6			3.3		Brownish gray mottled clay with silt and gravel	
7			0.2			
8						
9						
10						
11						
12						
13					End of soil boring at 10 feet below ground surface	
14					* Soil boring selected for laboratory analysis	
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-8		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

HOLE DIA: 2"
TOTAL DEPTH: 12'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0			13.9	dry	FILL: Sand and gravel	
1			2.3			
2			38.3	dry	Brownish mottled silty clay	
3			36.9*			
4			13.2			
5			15.8	dry	Brown mottled silty clay	
6			7.3			
7			6.3	dry		
8			1.8			
9			1.3			
10					Silty clay, with little gravel	
11				dry	Brown silty clay with sand	
12					End of soil boring at 12 feet below ground surface	
13					* Soil sample selected for laboratory analysis	
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-9		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

HOLE DIA: 2"
TOTAL DEPTH: 10'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0			1.1	dry	TOPSOIL: Sand	
1			9.9			
2			7.4*		Brown mottled silty clay, with little gravel	
3			6.8			
4			5.6	dry	Brown and gray mottled silty clay	
5			2.8			
6			0.5	dry		
7			0.6			
8			1.5	slightly	Brown silty clay	
9			1.6	moist		
10					End of soil boring at 10 feet below ground surface	
11					* Soil sample selected for laboratory analysis	
12						
13						
14						
15						
16						
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23						
24						
25						

Prepared by: CYV
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-10		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

HOLE DIA: 2"

TOTAL DEPTH: 10'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0			12	dry	Silty sand and gravel	
1			1.2			
2			1.6	dry	Brown mottled silty clay, with little sand and gravel	
3			1.1		Brown mottled clay	
4			1.0			
5			2.8*			
6			0.7	very moist	Brown mottled silty clay	
7			0.5	dry	Brown mottled silty clay	
8						
9						
10						
11						
12						
13					End of soil boring at 10 feet below ground surface	
14					* Soil boring selected for laboratory analysis	
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-11		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA: 2"

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

TOTAL DEPTH: 8'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0				dry	TOPSOIL: Dark brown silt	
1			6.3	dry	Brown mottled silty clay, with little sand and trace gravel	
2			1.1			
3						
4						
5			2.5*	moist	2" layer of moist brown sandy clay at 4.5 feet bgs Brown silty clay, with little sand and gravel	
6						
7			0.7			
8						
9					End of soil boring at 8 feet below ground surface	
10					* Soil boring selected for laboratory analysis	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-12		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA: 2"

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

TOTAL DEPTH: 8'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0				very dry	TOPSOIL: Dark gray silt	
1			1.1	dry	Brown mottled clay with little gravel	
2			0.8		Brown mottled silty clay	
3						
4						
5			0.4	very moist	Brown sandy clay with little silt	
6					Brown mottled silty clay	
7			2.3*	sl. moist	Brown mottled silty clay, with little sand and gravel	
8					End of soil boring at 8 feet below ground surface	
9					* Soil boring selected for laboratory analysis	
10						
11						
12						
13						
14						
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19						
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22						
23						
24						
25						

Prepared by: CYY
Checked by: AEH



5440 N. CUMBERLAND AVE.
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CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO:	SB-13		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

HOLE DIA: 2"

TOTAL DEPTH: 8'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0				dry	TOPSOIL: Dark gray silt	
1			0.5	dry	Silty clay	
2			5.8	moist	Mottled silty clay	
3						
4						
5			0.8*	very moist	2" layer of brown silty clay	
6						
7			0.3		Brown silty clay with sand and gravel	
8						
9					End of soil boring at 8 feet below ground surface	
10					* Soil boring selected for laboratory analysis	
11						
12						
13						
14						
15						
16						
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23						
24						
25						

Prepared by: CYH
Checked by: AEH



5440 N. CUMBERLAND AVE.
SUITE 250
CHICAGO, IL 60656

TEST BORING RECORD

Page 1 of 1

CLIENT:	Forest City - Washington	SITE:	Forrestal Village
BORING NO	SB-14		Great Lakes, IL
DATE:	6/23/2005		
LOGGED BY:	JFN	DRILLED BY:	Paramount
DRILLING METHOD:	Geoprobe	SAMPLING METHOD:	Continuous

HOLE DIA.: 2"

MACTEC PROJECT NUMBER:

MACTEC DRAWING NUMBER:

TOTAL DEPTH: 8'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING	MOISTURE CONTENT	LITHOLOGY	REMARKS
0				dry	TOPSOIL: Dark gray silt	
1			1.1	dry	Brown mottled silty clay, with little gravel	
2			0.8	to		
3			1.1	moist		
4			2.1			
5			2.1*	slight	Brown sandy clay	
6			0.3	moist	Brown mottled silty clay, with sand and gravel	
7						
8					End of soil boring at 8 feet below ground surface .	
9					* Soil boring selected for laboratory analysis	
10						
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Prepared by: CYY
Checked by: AEH

Appendix C

Analytical Laboratory Reports

STAT Analysis Corporation

2255 West Harrison St., Suite B, Chicago, IL 60612-3505

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

July 01, 2005

MACTEC Engineering and Consulting, Inc.

5440 N. Cumberland Avenue

Suite 250

Chicago, IL 60656

Telephone: (312) 617-8575

Fax: (312) 491-9716

RE: 3205050441, Forrestal Village, Great Lakes, IL

STAT Project No: 0506702

Dear Dennis Nagg:

STAT Analysis received 6 samples for the referenced project on 6/22/2005. The analytical results are presented in the following report.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAC standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 563-0371.

Sincerely,



Craig Chawla

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory.

Client: MACTEC Engineering and Consulting, Inc.
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab Order: 0506702

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
0506702-001A	SB-1 (11'-12')		6/22/2005 12:00:00 PM	6/22/2005
0506702-002A	SB-2 (11'-12')		6/22/2005 1:30:00 PM	6/22/2005
0506702-003A	SB-3 (0'-2')		6/22/2005 1:50:00 PM	6/22/2005
0506702-003B	SB-3 (0'-2')		6/22/2005 1:50:00 PM	6/22/2005
0506702-004A	SB-4 (0'-2')		6/22/2005 2:05:00 PM	6/22/2005
0506702-004B	SB-4 (0'-2')		6/22/2005 2:05:00 PM	6/22/2005
0506702-005A	SB-5 (2'-4')		6/22/2005 2:20:00 PM	6/22/2005
0506702-005B	SB-5 (2'-4')		6/22/2005 2:20:00 PM	6/22/2005
0506702-006A	SB-6 (2'-4')		6/22/2005 2:40:00 PM	6/22/2005
0506702-006B	SB-6 (2'-4')		6/22/2005 2:40:00 PM	6/22/2005

CLIENT: MACTEC Engineering and Consulting, Inc.
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab Order: 0506702

CASE NARRATIVE

The Laboratory Control Sample (LCS-15085-SVOC) had high SVOC soil spike recovery for 4-Chloro-3-methylphenol (102% Recovery, QC Limits 62-100%) and N-Nitrosodi-n-propylamine (114% Recovery, QC Limits 55-100%).

STAT Analysis Corporation

2255 West Harrison St., Suite B, Chicago, IL 60612-3505

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client:	MACTEC Engineering and Consulting, Inc.	Client Sample ID:	SB-1 (11'-12')
Lab Order:	0506702	Collection Date:	6/22/2005 12:00:00 PM
Project:	3205050441, Forrestal Village, Great Lakes, IL	Matrix:	Soil
Lab ID:	0506702-001		

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons						
	SW8270C-SIM (SW3550B)			Prep Date: 6/27/2005		Analyst: VS
Acenaphthene	ND	0.029		mg/Kg-dry	1	6/28/2005
Acenaphthylene	ND	0.029		mg/Kg-dry	1	6/28/2005
Anthracene	ND	0.029		mg/Kg-dry	1	6/28/2005
Benz(a)anthracene	ND	0.029		mg/Kg-dry	1	6/28/2005
Benzo(a)pyrene	ND	0.029		mg/Kg-dry	1	6/28/2005
Benzo(b)fluoranthene	ND	0.029		mg/Kg-dry	1	6/28/2005
Benzo(g,h,i)perylene	ND	0.029		mg/Kg-dry	1	6/28/2005
Benzo(k)fluoranthene	ND	0.029		mg/Kg-dry	1	6/28/2005
Chrysene	ND	0.029		mg/Kg-dry	1	6/28/2005
Dibenz(a,h)anthracene	ND	0.029		mg/Kg-dry	1	6/28/2005
Fluoranthene	ND	0.029		mg/Kg-dry	1	6/28/2005
Fluorene	ND	0.029		mg/Kg-dry	1	6/28/2005
Indeno(1,2,3-cd)pyrene	ND	0.029		mg/Kg-dry	1	6/28/2005
Naphthalene	ND	0.029		mg/Kg-dry	1	6/28/2005
Phenanthrene	0.03	0.029		mg/Kg-dry	1	6/28/2005
Pyrene	ND	0.029		mg/Kg-dry	1	6/28/2005
Percent Moisture						
	D2974			Prep Date: 6/27/2005		Analyst: RW
Percent Moisture	13.7	0.01	*	wt%	1	6/28/2005

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- HT - Sample received past holding time
- * - Non-accredited parameter

- RL - Reporting / Quantitation Limit for the analysis
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- H - Holding time exceeded

STAT Analysis Corporation

2255 West Harrison St., Suite B, Chicago, IL 60612-3505

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-002

Client Sample ID: SB-2 (11'-12')
Collection Date: 6/22/2005 1:30:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons						
	SW8270C-SIM (SW3550B)			Prep Date: 6/27/2005		Analyst: VS
Acenaphthene	ND	0.031		mg/Kg-dry	1	6/29/2005
Acenaphthylene	ND	0.031		mg/Kg-dry	1	6/29/2005
Anthracene	ND	0.031		mg/Kg-dry	1	6/29/2005
Benz(a)anthracene	ND	0.031		mg/Kg-dry	1	6/29/2005
Benzo(a)pyrene	ND	0.031		mg/Kg-dry	1	6/29/2005
Benzo(b)fluoranthene	ND	0.031		mg/Kg-dry	1	6/29/2005
Benzo(g,h,i)perylene	ND	0.031		mg/Kg-dry	1	6/29/2005
Benzo(k)fluoranthene	ND	0.031		mg/Kg-dry	1	6/29/2005
Chrysene	ND	0.031		mg/Kg-dry	1	6/29/2005
Dibenz(a,h)anthracene	ND	0.031		mg/Kg-dry	1	6/29/2005
Fluoranthene	ND	0.031		mg/Kg-dry	1	6/29/2005
Fluorene	ND	0.031		mg/Kg-dry	1	6/29/2005
Indeno(1,2,3-cd)pyrene	ND	0.031		mg/Kg-dry	1	6/29/2005
Naphthalene	ND	0.031		mg/Kg-dry	1	6/29/2005
Phenanthrene	ND	0.031		mg/Kg-dry	1	6/29/2005
Pyrene	ND	0.031		mg/Kg-dry	1	6/29/2005
Percent Moisture						
	D2974			Prep Date: 6/27/2005		Analyst: RW
Percent Moisture	19.0	0.01	*	wt%	1	6/28/2005

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits.
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT Analysis Corporation

2255 West Harrison St., Suite B, Chicago, IL 60612-3505

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client:	MACTEC Engineering and Consulting, Inc.	Client Sample ID:	SB-3 (0'-2')
Lab Order:	0506702	Collection Date:	6/22/2005 1:50:00 PM
Project:	3205050441, Forrestal Village, Great Lakes, IL	Matrix:	Soil
Lab ID:	0506702-003		

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons						
	SW8270C-SIM (SW3550B)		Prep Date: 6/27/2005		Analyst: VS	
Acenaphthene	ND	0.029		mg/Kg-dry	1	6/27/2005
Acenaphthylene	ND	0.029		mg/Kg-dry	1	6/27/2005
Anthracene	ND	0.029		mg/Kg-dry	1	6/27/2005
Benz(a)anthracene	ND	0.029		mg/Kg-dry	1	6/27/2005
Benzo(a)pyrene	ND	0.029		mg/Kg-dry	1	6/27/2005
Benzo(b)fluoranthene	ND	0.029		mg/Kg-dry	1	6/27/2005
Benzo(g,h,i)perylene	ND	0.029		mg/Kg-dry	1	6/27/2005
Benzo(k)fluoranthene	ND	0.029		mg/Kg-dry	1	6/27/2005
Chrysene	ND	0.029		mg/Kg-dry	1	6/27/2005
Dibenz(a,h)anthracene	ND	0.029		mg/Kg-dry	1	6/27/2005
Fluoranthene	ND	0.029		mg/Kg-dry	1	6/27/2005
Fluorene	ND	0.029		mg/Kg-dry	1	6/27/2005
Indeno(1,2,3-cd)pyrene	ND	0.029		mg/Kg-dry	1	6/27/2005
Naphthalene	ND	0.029		mg/Kg-dry	1	6/27/2005
Phenanthrene	ND	0.029		mg/Kg-dry	1	6/27/2005
Pyrene	ND	0.029		mg/Kg-dry	1	6/27/2005
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 6/24/2005		Analyst: PAB	
1,2,4-Trichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
1,2-Dichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
1,3-Dichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
1,4-Dichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
2, 2'-oxybis(1-Chloropropane	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4,5-Trichlorophenol	ND	0.38		mg/Kg-dry	1	6/27/2005
2,4,6-Trichlorophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4-Dichlorophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4-Dimethylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4-Dinitrophenol	ND	0.92		mg/Kg-dry	1	6/27/2005
2,4-Dinitrotoluene	ND	0.2		mg/Kg-dry	1	6/27/2005
2,6-Dinitrotoluene	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Chloronaphthalene	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Chlorophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Methylnaphthalene	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Methylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Nitroaniline	ND	0.92		mg/Kg-dry	1	6/27/2005
2-Nitrophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
3,3'-Dichlorobenzidine	ND	0.38		mg/Kg-dry	1	6/27/2005
3-Nitroaniline	ND	0.92		mg/Kg-dry	1	6/27/2005
4,6-Dinitro-2-methylphenol	ND	0.92		mg/Kg-dry	1	6/27/2005

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

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Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-003

Client Sample ID: SB-3 (0-2')
Collection Date: 6/22/2005 1:50:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)				Prep Date: 6/24/2005	Analyst: PAB
4-Bromophenyl phenyl ether	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Chloro-3-methylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Chloroaniline	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Chlorophenyl phenyl ether	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Methylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Nitroaniline	ND	0.92		mg/Kg-dry	1	6/27/2005
4-Nitrophenol	ND	0.92		mg/Kg-dry	1	6/27/2005
Aniline	ND	0.2		mg/Kg-dry	1	6/27/2005
Benzidine	ND	0.2		mg/Kg-dry	1	6/27/2005
Benzoic acid	ND	0.92		mg/Kg-dry	1	6/27/2005
Benzyl alcohol	ND	0.2		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethoxy)methane	ND	0.2		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethyl)ether	ND	0.2		mg/Kg-dry	1	6/27/2005
Bis(2-ethylhexyl)phthalate	0.26	0.2		mg/Kg-dry	1	6/27/2005
Butyl benzyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Carbazole	ND	0.2		mg/Kg-dry	1	6/27/2005
Di-n-butyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Di-n-octyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Dibenzofuran	ND	0.2		mg/Kg-dry	1	6/27/2005
Diethyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Dimethyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachlorobutadiene	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachlorocyclopentadiene	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachloroethane	ND	0.2		mg/Kg-dry	1	6/27/2005
Isophorone	ND	0.2		mg/Kg-dry	1	6/27/2005
N-Nitrosodi-n-propylamine	ND	0.2		mg/Kg-dry	1	6/27/2005
N-Nitrosodimethylamine	ND	0.2		mg/Kg-dry	1	6/27/2005
N-Nitrosodiphenylamine	ND	0.2		mg/Kg-dry	1	6/27/2005
Nitrobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
Pentachlorophenol	ND	0.92		mg/Kg-dry	1	6/27/2005
Phenol	ND	0.2		mg/Kg-dry	1	6/27/2005
Pyridine	ND	0.2		mg/Kg-dry	1	6/27/2005
BTEX by GC/MS						
	SW5035/8260B				Prep Date: 6/27/2005	Analyst: MP
Benzene	ND	0.0029		mg/Kg-dry	1	6/29/2005
Toluene	ND	0.0029		mg/Kg-dry	1	6/29/2005
Ethylbenzene	ND	0.0029		mg/Kg-dry	1	6/29/2005
Xylenes, Total	ND	0.0086		mg/Kg-dry	1	6/29/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT Analysis Corporation

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Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.

Lab Order: 0506702

Project: 3205050441, Forrestal Village, Great Lakes, IL

Lab ID: 0506702-003

Client Sample ID: SB-3 (0'-2')

Collection Date: 6/22/2005 1:50:00 PM

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Percent Moisture	D2974					Prep Date: 6/27/2005 Analyst: RW
Percent Moisture	13.8	0.01	*	wt%	1	6/28/2005

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-004

Client Sample ID: SB-4 (0'-2')
Collection Date: 6/22/2005 2:05:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Polynuclear Aromatic Hydrocarbons SW8270C-SIM (SW3550B) Prep Date: 6/27/2005 Analyst: VS

Acenaphthene	ND	0.035		mg/Kg-dry	10	6/29/2005
Acenaphthylene	ND	0.035		mg/Kg-dry	10	6/29/2005
Anthracene	ND	0.035		mg/Kg-dry	10	6/29/2005
Benz(a)anthracene	0.068	0.035		mg/Kg-dry	10	6/29/2005
Benzo(a)pyrene	0.043	0.035		mg/Kg-dry	10	6/29/2005
Benzo(b)fluoranthene	0.064	0.035		mg/Kg-dry	10	6/29/2005
Benzo(g,h,i)perylene	0.039	0.035		mg/Kg-dry	10	6/29/2005
Benzo(k)fluoranthene	0.061	0.035		mg/Kg-dry	10	6/29/2005
Chrysene	0.068	0.035		mg/Kg-dry	10	6/29/2005
Dibenz(a,h)anthracene	ND	0.035		mg/Kg-dry	10	6/29/2005
Fluoranthene	0.093	0.035		mg/Kg-dry	10	6/29/2005
Fluorene	ND	0.035		mg/Kg-dry	10	6/29/2005
Indeno(1,2,3-cd)pyrene	ND	0.035		mg/Kg-dry	10	6/29/2005
Naphthalene	ND	0.035		mg/Kg-dry	10	6/29/2005
Phenanthrene	0.043	0.035		mg/Kg-dry	10	6/29/2005
Pyrene	0.15	0.035		mg/Kg-dry	10	6/29/2005

Semivolatile Organic Compounds by GC/MS SW8270C (SW3550B) Prep Date: 6/24/2005 Analyst: PAB

1,2,4-Trichlorobenzene	ND	0.18		mg/Kg-dry	1	6/27/2005
1,2-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	6/27/2005
1,3-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	6/27/2005
1,4-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	6/27/2005
2, 2'-oxybis(1-Chloropropane)	ND	0.18		mg/Kg-dry	1	6/27/2005
2,4,5-Trichlorophenol	ND	0.35		mg/Kg-dry	1	6/27/2005
2,4,6-Trichlorophenol	ND	0.18		mg/Kg-dry	1	6/27/2005
2,4-Dichlorophenol	ND	0.18		mg/Kg-dry	1	6/27/2005
2,4-Dimethylphenol	ND	0.18		mg/Kg-dry	1	6/27/2005
2,4-Dinitrophenol	ND	0.86		mg/Kg-dry	1	6/27/2005
2,4-Dinitrotoluene	ND	0.18		mg/Kg-dry	1	6/27/2005
2,6-Dinitrotoluene	ND	0.18		mg/Kg-dry	1	6/27/2005
2-Chloronaphthalene	ND	0.18		mg/Kg-dry	1	6/27/2005
2-Chlorophenol	ND	0.18		mg/Kg-dry	1	6/27/2005
2-Methylnaphthalene	ND	0.18		mg/Kg-dry	1	6/27/2005
2-Methylphenol	ND	0.18		mg/Kg-dry	1	6/27/2005
2-Nitroaniline	ND	0.86		mg/Kg-dry	1	6/27/2005
2-Nitrophenol	ND	0.18		mg/Kg-dry	1	6/27/2005
3,3'-Dichlorobenzidine	ND	0.35		mg/Kg-dry	1	6/27/2005
3-Nitroaniline	ND	0.86		mg/Kg-dry	1	6/27/2005
4,6-Dinitro-2-methylphenol	ND	0.86		mg/Kg-dry	1	6/27/2005

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-004

Client Sample ID: SB-4 (0'-2')
Collection Date: 6/22/2005 2:05:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatle Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 6/24/2005		Analyst: PAB	
4-Bromophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	6/27/2005
4-Chloro-3-methylphenol	ND	0.18		mg/Kg-dry	1	6/27/2005
4-Chloroaniline	ND	0.18		mg/Kg-dry	1	6/27/2005
4-Chlorophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	6/27/2005
4-Methylphenol	ND	0.18		mg/Kg-dry	1	6/27/2005
4-Nitroaniline	ND	0.86		mg/Kg-dry	1	6/27/2005
4-Nitrophenol	ND	0.86		mg/Kg-dry	1	6/27/2005
Aniline	ND	0.18		mg/Kg-dry	1	6/27/2005
Benzidine	ND	0.18		mg/Kg-dry	1	6/27/2005
Benzoic acid	ND	0.86		mg/Kg-dry	1	6/27/2005
Benzyl alcohol	ND	0.18		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethoxy)methane	ND	0.18		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethyl)ether	ND	0.18		mg/Kg-dry	1	6/27/2005
Bis(2-ethylhexyl)phthalate	ND	0.18		mg/Kg-dry	1	6/27/2005
Butyl benzyl phthalate	ND	0.18		mg/Kg-dry	1	6/27/2005
Carbazole	ND	0.18		mg/Kg-dry	1	6/27/2005
Di-n-butyl phthalate	ND	0.18		mg/Kg-dry	1	6/27/2005
Di-n-octyl phthalate	ND	0.18		mg/Kg-dry	1	6/27/2005
Dibenzofuran	ND	0.18		mg/Kg-dry	1	6/27/2005
Diethyl phthalate	ND	0.18		mg/Kg-dry	1	6/27/2005
Dimethyl phthalate	ND	0.18		mg/Kg-dry	1	6/27/2005
Hexachlorobenzene	ND	0.18		mg/Kg-dry	1	6/27/2005
Hexachlorobutadiene	ND	0.18		mg/Kg-dry	1	6/27/2005
Hexachlorocyclopentadiene	ND	0.18		mg/Kg-dry	1	6/27/2005
Hexachloroethane	ND	0.18		mg/Kg-dry	1	6/27/2005
Isophorone	ND	0.18		mg/Kg-dry	1	6/27/2005
N-Nitrosodi-n-propylamine	ND	0.18		mg/Kg-dry	1	6/27/2005
N-Nitrosodimethylamine	ND	0.18		mg/Kg-dry	1	6/27/2005
N-Nitrosodiphenylamine	ND	0.18		mg/Kg-dry	1	6/27/2005
Nitrobenzene	ND	0.18		mg/Kg-dry	1	6/27/2005
Pentachlorophenol	ND	0.86		mg/Kg-dry	1	6/27/2005
Phenol	ND	0.18		mg/Kg-dry	1	6/27/2005
Pyridine	ND	0.18		mg/Kg-dry	1	6/27/2005
BTEX by GC/MS						
	SW5035/8260B		Prep Date: 6/27/2005		Analyst: MP	
Benzene	ND	0.0044		mg/Kg-dry	1	6/29/2005
Toluene	ND	0.0044		mg/Kg-dry	1	6/29/2005
Ethylbenzene	ND	0.0044		mg/Kg-dry	1	6/29/2005
Xylenes, Total	ND	0.013		mg/Kg-dry	1	6/29/2005

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-004

Client Sample ID: SB-4 (0'-2')
Collection Date: 6/22/2005 2:05:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Percent Moisture	D2974					Prep Date: 6/27/2005 Analyst: RW
Percent Moisture	8.15	0.01	*	wt%	1	6/28/2005

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-005

Client Sample ID: SB-5 (2'-4')
Collection Date: 6/22/2005 2:20:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons						
	SW8270C-SIM (SW3550B)		Prep Date: 6/27/2005		Analyst: VS	
Acenaphthene	ND	0.028		mg/Kg-dry	1	6/27/2005
Acenaphthylene	ND	0.028		mg/Kg-dry	1	6/27/2005
Anthracene	ND	0.028		mg/Kg-dry	1	6/27/2005
Benz(a)anthracene	ND	0.028		mg/Kg-dry	1	6/27/2005
Benzo(a)pyrene	ND	0.028		mg/Kg-dry	1	6/27/2005
Benzo(b)fluoranthene	ND	0.028		mg/Kg-dry	1	6/27/2005
Benzo(g,h,i)perylene	ND	0.028		mg/Kg-dry	1	6/27/2005
Benzo(k)fluoranthene	ND	0.028		mg/Kg-dry	1	6/27/2005
Chrysene	ND	0.028		mg/Kg-dry	1	6/27/2005
Dibenz(a,h)anthracene	ND	0.028		mg/Kg-dry	1	6/27/2005
Fluoranthene	ND	0.028		mg/Kg-dry	1	6/27/2005
Fluorene	ND	0.028		mg/Kg-dry	1	6/27/2005
Indeno(1,2,3-cd)pyrene	ND	0.028		mg/Kg-dry	1	6/27/2005
Naphthalene	ND	0.028		mg/Kg-dry	1	6/27/2005
Phenanthrene	ND	0.028		mg/Kg-dry	1	6/27/2005
Pyrene	ND	0.028		mg/Kg-dry	1	6/27/2005
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 6/24/2005		Analyst: PAB	
1,2,4-Trichlorobenzene	ND	0.19		mg/Kg-dry	1	6/27/2005
1,2-Dichlorobenzene	ND	0.19		mg/Kg-dry	1	6/27/2005
1,3-Dichlorobenzene	ND	0.19		mg/Kg-dry	1	6/27/2005
1,4-Dichlorobenzene	ND	0.19		mg/Kg-dry	1	6/27/2005
2, 2'-oxybis(1-Chloropropane	ND	0.19		mg/Kg-dry	1	6/27/2005
2,4,5-Trichlorophenol	ND	0.37		mg/Kg-dry	1	6/27/2005
2,4,6-Trichlorophenol	ND	0.19		mg/Kg-dry	1	6/27/2005
2,4-Dichlorophenol	ND	0.19		mg/Kg-dry	1	6/27/2005
2,4-Dimethylphenol	ND	0.19		mg/Kg-dry	1	6/27/2005
2,4-Dinitrophenol	ND	0.9		mg/Kg-dry	1	6/27/2005
2,4-Dinitrotoluene	ND	0.19		mg/Kg-dry	1	6/27/2005
2,6-Dinitrotoluene	ND	0.19		mg/Kg-dry	1	6/27/2005
2-Chloronaphthalene	ND	0.19		mg/Kg-dry	1	6/27/2005
2-Chlorophenol	ND	0.19		mg/Kg-dry	1	6/27/2005
2-Methylnaphthalene	ND	0.19		mg/Kg-dry	1	6/27/2005
2-Methylphenol	ND	0.19		mg/Kg-dry	1	6/27/2005
2-Nitroaniline	ND	0.9		mg/Kg-dry	1	6/27/2005
2-Nitrophenol	ND	0.19		mg/Kg-dry	1	6/27/2005
3,3'-Dichlorobenzidine	ND	0.37		mg/Kg-dry	1	6/27/2005
3-Nitroaniline	ND	0.9		mg/Kg-dry	1	6/27/2005
4,6-Dinitro-2-methylphenol	ND	0.9		mg/Kg-dry	1	6/27/2005

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-005

Client Sample ID: SB-5 (2'-4')
Collection Date: 6/22/2005 2:20:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)			Prep Date: 6/24/2005		Analyst: PAB
4-Bromophenyl phenyl ether	ND	0.19		mg/Kg-dry	1	6/27/2005
4-Chloro-3-methylphenol	ND	0.19		mg/Kg-dry	1	6/27/2005
4-Chloroaniline	ND	0.19		mg/Kg-dry	1	6/27/2005
4-Chlorophenyl phenyl ether	ND	0.19		mg/Kg-dry	1	6/27/2005
4-Methylphenol	ND	0.19		mg/Kg-dry	1	6/27/2005
4-Nitroaniline	ND	0.9		mg/Kg-dry	1	6/27/2005
4-Nitrophenol	ND	0.9		mg/Kg-dry	1	6/27/2005
Aniline	ND	0.19		mg/Kg-dry	1	6/27/2005
Benzidine	ND	0.19		mg/Kg-dry	1	6/27/2005
Benzoic acid	ND	0.9		mg/Kg-dry	1	6/27/2005
Benzyl alcohol	ND	0.19		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethoxy)methane	ND	0.19		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethyl)ether	ND	0.19		mg/Kg-dry	1	6/27/2005
Bis(2-ethylhexyl)phthalate	ND	0.19		mg/Kg-dry	1	6/27/2005
Butyl benzyl phthalate	ND	0.19		mg/Kg-dry	1	6/27/2005
Carbazole	ND	0.19		mg/Kg-dry	1	6/27/2005
Di-n-butyl phthalate	ND	0.19		mg/Kg-dry	1	6/27/2005
Di-n-octyl phthalate	ND	0.19		mg/Kg-dry	1	6/27/2005
Dibenzofuran	ND	0.19		mg/Kg-dry	1	6/27/2005
Diethyl phthalate	ND	0.19		mg/Kg-dry	1	6/27/2005
Dimethyl phthalate	ND	0.19		mg/Kg-dry	1	6/27/2005
Hexachlorobenzene	ND	0.19		mg/Kg-dry	1	6/27/2005
Hexachlorobutadiene	ND	0.19		mg/Kg-dry	1	6/27/2005
Hexachlorocyclopentadiene	ND	0.19		mg/Kg-dry	1	6/27/2005
Hexachloroethane	ND	0.19		mg/Kg-dry	1	6/27/2005
Isophorone	ND	0.19		mg/Kg-dry	1	6/27/2005
N-Nitrosodi-n-propylamine	ND	0.19		mg/Kg-dry	1	6/27/2005
N-Nitrosodimethylamine	ND	0.19		mg/Kg-dry	1	6/27/2005
N-Nitrosodiphenylamine	ND	0.19		mg/Kg-dry	1	6/27/2005
Nitrobenzene	ND	0.19		mg/Kg-dry	1	6/27/2005
Pentachlorophenol	ND	0.9		mg/Kg-dry	1	6/27/2005
Phenol	ND	0.19		mg/Kg-dry	1	6/27/2005
Pyridine	ND	0.19		mg/Kg-dry	1	6/27/2005
BTEX by GC/MS						
	SW5035/8260B			Prep Date: 6/27/2005		Analyst: MP
Benzene	ND	0.0028		mg/Kg-dry	1	6/29/2005
Toluene	ND	0.0028		mg/Kg-dry	1	6/29/2005
Ethylbenzene	ND	0.0028		mg/Kg-dry	1	6/29/2005
Xylenes, Total	ND	0.0084		mg/Kg-dry	1	6/29/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client:	MACTEC Engineering and Consulting, Inc.	Client Sample ID:	SB-5 (2'-4")
Lab Order:	0506702	Collection Date:	6/22/2005 2:20:00 PM
Project:	3205050441, Forrestal Village, Great Lakes, IL	Matrix:	Soil
Lab ID:	0506702-005		

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Percent Moisture	D2974					
Percent Moisture	12.5	0.01	*	wt%	1	Prep Date: 6/27/2005 Analyst: RW 6/28/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-006

Client Sample ID: SB-6 (2'-4')
Collection Date: 6/22/2005 2:40:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons						
	SW8270C-SIM (SW3550B)			Prep Date: 6/27/2005	Analyst: VS	
Acenaphthene	1.6	0.29		mg/Kg-dry	10	6/29/2005
Acenaphthylene	0.48	0.29		mg/Kg-dry	10	6/29/2005
Anthracene	0.66	0.29		mg/Kg-dry	10	6/29/2005
Benz(a)anthracene	ND	0.029		mg/Kg-dry	1	6/29/2005
Benzo(a)pyrene	ND	0.029		mg/Kg-dry	1	6/29/2005
Benzo(b)fluoranthene	ND	0.029		mg/Kg-dry	1	6/29/2005
Benzo(g,h,i)perylene	ND	0.029		mg/Kg-dry	1	6/29/2005
Benzo(k)fluoranthene	ND	0.029		mg/Kg-dry	1	6/29/2005
Chrysene	0.061	0.029		mg/Kg-dry	1	6/29/2005
Dibenz(a,h)anthracene	ND	0.029		mg/Kg-dry	1	6/29/2005
Fluoranthene	0.32	0.29		mg/Kg-dry	10	6/29/2005
Fluorene	3.9	2.9		mg/Kg-dry	100	6/29/2005
Indeno(1,2,3-cd)pyrene	ND	0.029		mg/Kg-dry	1	6/29/2005
Naphthalene	3.7	2.9		mg/Kg-dry	100	6/29/2005
Phenanthrene	8	2.9		mg/Kg-dry	100	6/29/2005
Pyrene	0.73	0.29		mg/Kg-dry	10	6/29/2005
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)			Prep Date: 6/24/2005	Analyst: PAB	
1,2,4-Trichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
1,2-Dichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
1,3-Dichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
1,4-Dichlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
2, 2'-oxybis(1-Chloropropane	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4,5-Trichlorophenol	ND	0.38		mg/Kg-dry	1	6/27/2005
2,4,6-Trichlorophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4-Dichlorophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4-Dimethylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2,4-Dinitrophenol	ND	0.92		mg/Kg-dry	1	6/27/2005
2,4-Dinitrotoluene	ND	0.2		mg/Kg-dry	1	6/27/2005
2,6-Dinitrotoluene	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Chloronaphthalene	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Chlorophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Methylnaphthalene	8.9	0.98		mg/Kg-dry	5	6/29/2005
2-Methylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
2-Nitroaniline	ND	0.92		mg/Kg-dry	1	6/27/2005
2-Nitrophenol	ND	0.2		mg/Kg-dry	1	6/27/2005
3,3'-Dichlorobenzidine	ND	0.38		mg/Kg-dry	1	6/27/2005
3-Nitroaniline	ND	0.92		mg/Kg-dry	1	6/27/2005
4,6-Dinitro-2-methylphenol	ND	0.92		mg/Kg-dry	1	6/27/2005

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
 Lab Order: 0506702
 Project: 3205050441, Forrestal Village, Great Lakes, IL
 Lab ID: 0506702-006

Client Sample ID: SB-6 (2'-4')
 Collection Date: 6/22/2005 2:40:00 PM
 Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 6/24/2005		Analyst: PAB	
4-Bromophenyl phenyl ether	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Chloro-3-methylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Chloroaniline	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Chlorophenyl phenyl ether	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Methylphenol	ND	0.2		mg/Kg-dry	1	6/27/2005
4-Nitroaniline	ND	0.92		mg/Kg-dry	1	6/27/2005
4-Nitrophenol	ND	0.92		mg/Kg-dry	1	6/27/2005
Aniline	ND	0.2		mg/Kg-dry	1	6/27/2005
Benzidine	ND	0.2		mg/Kg-dry	1	6/27/2005
Benzoic acid	ND	0.92		mg/Kg-dry	1	6/27/2005
Benzyl alcohol	ND	0.2		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethoxy)methane	ND	0.2		mg/Kg-dry	1	6/27/2005
Bis(2-chloroethyl)ether	ND	0.2		mg/Kg-dry	1	6/27/2005
Bis(2-ethylhexyl)phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Butyl benzyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Carbazole	0.97	0.2		mg/Kg-dry	1	6/27/2005
Di-n-butyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Di-n-octyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Dibenzofuran	2.2	0.2		mg/Kg-dry	1	6/27/2005
Diethyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Dimethyl phthalate	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachlorobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachlorobutadiene	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachlorocyclopentadiene	ND	0.2		mg/Kg-dry	1	6/27/2005
Hexachloroethane	ND	0.2		mg/Kg-dry	1	6/27/2005
Isophorone	ND	0.2		mg/Kg-dry	1	6/27/2005
N-Nitrosodi-n-propylamine	ND	0.2		mg/Kg-dry	1	6/27/2005
N-Nitrosodimethylamine	ND	0.2		mg/Kg-dry	1	6/27/2005
N-Nitrosodiphenylamine	ND	0.2		mg/Kg-dry	1	6/27/2005
Nitrobenzene	ND	0.2		mg/Kg-dry	1	6/27/2005
Perchlorophenol	ND	0.92		mg/Kg-dry	1	6/27/2005
Phenol	ND	0.2		mg/Kg-dry	1	6/27/2005
Pyridine	ND	0.2		mg/Kg-dry	1	6/27/2005
BTEX by GC/MS						
	SW5035/8260B		Prep Date: 6/27/2005		Analyst: MP	
Benzene	2.3	0.15		mg/Kg-dry	50	6/30/2005
Toluene	0.011	0.0034		mg/Kg-dry	1	6/30/2005
Ethylbenzene	5.4	0.15		mg/Kg-dry	50	6/30/2005
Xylenes, Total	4.4	0.46		mg/Kg-dry	50	6/30/2005

Qualifiers:
 ND - Not Detected at the Reporting Limit
 J - Analyte detected below quantitation limits
 B - Analyte detected in the associated Method Blank
 HT - Sample received past holding time
 * - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
 S - Spike Recovery outside accepted recovery limits
 R - RPD outside accepted recovery limits
 E - Value above quantitation range
 H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 01, 2005

Date Printed: July 01, 2005

Client: MACTEC Engineering and Consulting, Inc.
Lab Order: 0506702
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab ID: 0506702-006

Client Sample ID: SB-6 (2'-4')
Collection Date: 6/22/2005 2:40:00 PM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Percent Moisture	D2974					Prep Date: 6/27/2005 Analyst: RW
Percent Moisture	13.9	0.01	*	wt%	1	6/28/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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e-mail address: STATinfo@STATAnalysis.com AIHA 10248, NVLAP 101202-0, NEALP 100445

CHAIN OF CUSTODY RECORD

Nº: 809291

Page: of

Company: MACTEC								P.O. No.:	
Project Number: 3205050441				Client Tracking No.:				Quote No.:	
Project Name: FORRESTAL VILLAGE									
Location/Address: GREEN LAKES, IL									
Sampler(s): CARMEN YUNG									
Report To: DENNIS NAGG				Phone: 773-693-6030				Turn Around:	
QC Level: 1 2 3 4				Fax: 773-693-6039				Results Needed:	
Regulatory Program: NPDES/MWRD RCRA SDWA SRP TACO Other:								NORMAL	

Client Sample Number/Description:	Date Taken	Time Taken	Matrix	Comp.	Grab	Preserv.	No. of Containers	Remarks	am/pm
SB-1 (1'-12')	6/22	12:00p	SOIL	X			1	X	
SB-2 (1'-12')		1:30p	SOIL	X			1	X	
SB-3 (0'-2')		1:50p	SOIL	X			4	XX	
SB-4 (0'-2')		2:05p	SOIL	X			4	XX	
SB-5 (2'-4')		2:20p	SOIL	X			4	XX	
SB-6 (2'-4')		2:40p	SOIL	X			4	XX	

Relinquished by: (Signature) CARMEN YUNG	Date/Time: 6/22/05	Laboratory Use:	Sample Verification:	Work Order No. 0805702
Received by: (Signature) Sam [unclear]	Date/Time: 6/22/05	Container ID:		
Relinquished by: (Signature) Sam [unclear]	Date/Time: 6/22/05	Impoundment:		
Received for lab by: (Signature) Sam [unclear]	Date/Time: 6/22/05	Analysis Requested:		
Relinquished by: (Signature) Sam [unclear]	Date/Time:	Analysis Results:		

Preservation Code:
A = None B = HNO₃ C = NaOH
D = H₂SO₄ E = HCl F = 5035/EnCore

Sample Receipt Checklist

Client Name MACTEC

Date and Time Received:

06/22/05

Work Order Number 0506702

Received by: JC

Checklist completed by:

Jesus Cant
Signature

6/22/05
Date

Reviewed by:

sc
Initials

6/30/05
Date

Matrix

Carrier name STAT Analysis

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature 6 °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Water - Samples properly preserved/ pH checked?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	

Adjusted? _____

Checked by _____

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted _____

Date contacted: _____

Person contacted _____

Contacted by: _____

Regarding _____

Comments: _____

Corrective Action _____

STAT Analysis Corporation

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

July 04, 2005

MACTEC Engineering and Consulting, Inc.

5440 N. Cumberland Avenue

Suite 250

Chicago, IL 60656

Telephone: (312) 617-8575

Fax: (312) 491-9716

RE: 3205050441, Forrestal Village, Great Lakes, IL

STAT Project No: 0506810

Dear Dennis Nagg:

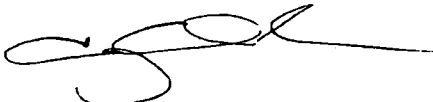
STAT Analysis received 12 samples for the referenced project on 6/24/2005. The analytical results are presented in the following report.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAC standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 563-0371.

Sincerely,



Craig Chawla

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory.

Client: MACTEC Engineering and Consulting, Inc.
Project: 3205050441, Forrestal Village, Great Lakes, IL
Lab Order: 0506810

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
0506810-001A	SB7 5'		6/23/2005 9:00:00 AM	6/24/2005
0506810-001B	SB7 5'		6/23/2005 9:00:00 AM	6/24/2005
0506810-002A	SB8 3.5'		6/23/2005 9:30:00 AM	6/24/2005
0506810-002B	SB8 3.5'		6/23/2005 9:30:00 AM	6/24/2005
0506810-003A	SB9 2.5'		6/23/2005 10:02:00 AM	6/24/2005
0506810-003B	SB9 2.5'		6/23/2005 10:02:00 AM	6/24/2005
0506810-004A	SB10 6'		6/23/2005 10:30:00 AM	6/24/2005
0506810-004B	SB10 6'		6/23/2005 10:30:00 AM	6/24/2005
0506810-005A	SB11 4.5'		6/23/2005 11:05:00 AM	6/24/2005
0506810-005B	SB11 4.5'		6/23/2005 11:05:00 AM	6/24/2005
0506810-006A	SB12 6.5'		6/23/2005 11:50:00 AM	6/24/2005
0506810-006B	SB12 6.5'		6/23/2005 11:50:00 AM	6/24/2005
0506810-007A	SB13 6'		6/23/2005 12:15:00 PM	6/24/2005
0506810-007B	SB13 6'		6/23/2005 12:15:00 PM	6/24/2005
0506810-008A	SB14 6.5'		6/23/2005 12:40:00 PM	6/24/2005
0506810-008B	SB14 6.5'		6/23/2005 12:40:00 PM	6/24/2005
0506810-009A	SB13GW		6/23/2005 2:00:00 PM	6/24/2005
0506810-010A	3160D 2"		6/23/2005 2:50:00 PM	6/24/2005
0506810-011A	3156D 2"		6/23/2005 2:55:00 PM	6/24/2005
0506810-012A	3028G 2"		6/23/2005 3:15:00 PM	6/24/2005

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 04, 2005

Date Printed: July 04, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441, Forrestal Village, Great Lakes, IL

Lab Order: 0506810

Lab ID: 0506810-001

Collection Date: 6/23/2005 9:00:00 AM

Client Sample ID: SB7 5'

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons						
	SW8270C-SIM (SW3550B)			Prep Date: 6/28/2005		Analyst: VS
Acenaphthene	ND	0.029		mg/Kg-dry	1	6/30/2005
Acenaphthylene	ND	0.029		mg/Kg-dry	1	6/30/2005
Anthracene	ND	0.029		mg/Kg-dry	1	6/30/2005
Benz(a)anthracene	ND	0.029		mg/Kg-dry	1	6/30/2005
Benzo(a)pyrene	ND	0.029		mg/Kg-dry	1	6/30/2005
Benzo(b)fluoranthene	ND	0.029		mg/Kg-dry	1	6/30/2005
Benzo(g,h,i)perylene	ND	0.029		mg/Kg-dry	1	6/30/2005
Benzo(k)fluoranthene	ND	0.029		mg/Kg-dry	1	6/30/2005
Chrysene	ND	0.029		mg/Kg-dry	1	6/30/2005
Dibenz(a,h)anthracene	ND	0.029		mg/Kg-dry	1	6/30/2005
Fluoranthene	ND	0.029		mg/Kg-dry	1	6/30/2005
Fluorene	ND	0.029		mg/Kg-dry	1	6/30/2005
Indeno(1,2,3-cd)pyrene	ND	0.029		mg/Kg-dry	1	6/30/2005
Naphthalene	ND	0.029		mg/Kg-dry	1	6/30/2005
Phenanthrene	ND	0.029		mg/Kg-dry	1	6/30/2005
Pyrene	ND	0.029		mg/Kg-dry	1	6/30/2005
BTEX by GC/MS						
	SW5035/8260B			Prep Date: 6/29/2005		Analyst: PS
Benzene	ND	0.0027		mg/Kg-dry	1	7/1/2005
Toluene	ND	0.0027		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.0027		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.008		mg/Kg-dry	1	7/1/2005
Percent Moisture						
	D2974			Prep Date: 6/28/2005		Analyst: RW
Percent Moisture	12.9	0.01		wt%	1	6/29/2005

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 04, 2005

Date Printed: July 04, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441, Forrestal Village, Great Lakes, IL**Lab Order:** 0506810**Lab ID:** 0506810-002**Collection Date:** 6/23/2005 9:30:00 AM**Client Sample ID:** SB8 3.5'**Matrix:** Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Polynuclear Aromatic Hydrocarbons**SW8270C-SIM (SW3550B)****Prep Date:** 6/28/2005**Analyst:** VS

Acenaphthene	ND	0.028		mg/Kg-dry	1	6/30/2005
Acenaphthylene	ND	0.028		mg/Kg-dry	1	6/30/2005
Anthracene	0.031	0.028		mg/Kg-dry	1	6/30/2005
Benz(a)anthracene	0.099	0.028		mg/Kg-dry	1	6/30/2005
Benzo(a)pyrene	0.089	0.028		mg/Kg-dry	1	6/30/2005
Benzo(b)fluoranthene	0.11	0.028		mg/Kg-dry	1	6/30/2005
Benzo(g,h,i)perylene	0.056	0.028		mg/Kg-dry	1	6/30/2005
Benzo(k)fluoranthene	0.072	0.028		mg/Kg-dry	1	6/30/2005
Chrysene	0.11	0.028		mg/Kg-dry	1	6/30/2005
Dibenz(a,h)anthracene	ND	0.028		mg/Kg-dry	1	6/30/2005
Fluoranthene	0.22	0.028		mg/Kg-dry	1	6/30/2005
Fluorene	ND	0.028		mg/Kg-dry	1	6/30/2005
Indeno(1,2,3-cd)pyrene	0.059	0.028		mg/Kg-dry	1	6/30/2005
Naphthalene	ND	0.028		mg/Kg-dry	1	6/30/2005
Phenanthrene	0.17	0.028		mg/Kg-dry	1	6/30/2005
Pyrene	0.17	0.028		mg/Kg-dry	1	6/30/2005

BTEX by GC/MS**SW5035/8260B****Prep Date:** 6/29/2005**Analyst:** PS

Benzene	ND	0.0036		mg/Kg-dry	1	7/1/2005
Toluene	ND	0.0036		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.0036		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.011		mg/Kg-dry	1	7/1/2005

Percent Moisture**D2974****Prep Date:** 6/28/2005**Analyst:** RW

Percent Moisture	12.2	0.01	*	wt%	1	6/29/2005
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Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT Analysis Corporation

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 04, 2005

Date Printed: July 04, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441, Forrestal Village, Great Lakes, IL**Lab Order:** 0506810**Lab ID:** 0506810-003**Collection Date:** 6/23/2005 10:02:00 AM**Client Sample ID:** SB9 2.5'**Matrix:** Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Polynuclear Aromatic Hydrocarbons**SW8270C-SIM (SW3550B)****Prep Date:** 6/28/2005**Analyst:** VS

Acenaphthene	ND	0.025		mg/Kg-dry	1	6/30/2005
Acenaphthylene	ND	0.025		mg/Kg-dry	1	6/30/2005
Anthracene	ND	0.025		mg/Kg-dry	1	6/30/2005
Benzo(a)anthracene	ND	0.025		mg/Kg-dry	1	6/30/2005
Benzo(a)pyrene	ND	0.025		mg/Kg-dry	1	6/30/2005
Benzo(b)fluoranthene	0.031	0.025		mg/Kg-dry	1	6/30/2005
Benzo(g,h,i)perylene	0.026	0.025		mg/Kg-dry	1	6/30/2005
Benzo(k)fluoranthene	ND	0.025		mg/Kg-dry	1	6/30/2005
Chrysene	ND	0.025		mg/Kg-dry	1	6/30/2005
Dibenz(a,h)anthracene	ND	0.025		mg/Kg-dry	1	6/30/2005
Fluoranthene	ND	0.025		mg/Kg-dry	1	6/30/2005
Fluorene	ND	0.025		mg/Kg-dry	1	6/30/2005
Indeno(1,2,3-cd)pyrene	0.026	0.025		mg/Kg-dry	1	6/30/2005
Naphthalene	ND	0.025		mg/Kg-dry	1	6/30/2005
Phenanthrene	ND	0.025		mg/Kg-dry	1	6/30/2005
Pyrene	ND	0.025		mg/Kg-dry	1	6/30/2005

BTEX by GC/MS**SW5035/8260B****Prep Date:** 6/29/2005**Analyst:** PS

Benzene	ND	0.0031		mg/Kg-dry	1	7/1/2005
Toluene	ND	0.0031		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.0031		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.0093		mg/Kg-dry	1	7/1/2005

Percent Moisture**D2974****Prep Date:** 6/28/2005**Analyst:** RW

Percent Moisture	4.19	0.01		wt%	1	6/29/2005
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Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 04, 2005

Date Printed: July 04, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441, Forrestal Village, Great Lakes, IL**Lab Order:** 0506810**Lab ID:** 0506810-004**Collection Date:** 6/23/2005 10:30:00 AM**Client Sample ID:** SB10 6'**Matrix:** Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Polynuclear Aromatic Hydrocarbons**SW8270C-SIM (SW3550B)****Prep Date:** 6/28/2005**Analyst:** VS

Acenaphthene	ND	0.03		mg/Kg-dry	1	6/30/2005
Acenaphthylene	ND	0.03		mg/Kg-dry	1	6/30/2005
Anthracene	ND	0.03		mg/Kg-dry	1	6/30/2005
Benz(a)anthracene	ND	0.03		mg/Kg-dry	1	6/30/2005
Benzo(a)pyrene	ND	0.03		mg/Kg-dry	1	6/30/2005
Benzo(b)fluoranthene	ND	0.03		mg/Kg-dry	1	6/30/2005
Benzo(g,h,i)perylene	ND	0.03		mg/Kg-dry	1	6/30/2005
Benzo(k)fluoranthene	ND	0.03		mg/Kg-dry	1	6/30/2005
Chrysene	ND	0.03		mg/Kg-dry	1	6/30/2005
Dibenz(a,h)anthracene	ND	0.03		mg/Kg-dry	1	6/30/2005
Fluoranthene	ND	0.03		mg/Kg-dry	1	6/30/2005
Fluorene	ND	0.03		mg/Kg-dry	1	6/30/2005
Indeno(1,2,3-cd)pyrene	ND	0.03		mg/Kg-dry	1	6/30/2005
Naphthalene	ND	0.03		mg/Kg-dry	1	6/30/2005
Phenanthrene	ND	0.03		mg/Kg-dry	1	6/30/2005
Pyrene	ND	0.03		mg/Kg-dry	1	6/30/2005

BTEX by GC/MS**SW5035/8260B****Prep Date:** 6/29/2005**Analyst:** PS

Benzene	ND	0.021		mg/Kg-dry	1	7/1/2005
Toluene	ND	0.021		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.021		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.062		mg/Kg-dry	1	7/1/2005

Percent Moisture**D2974****Prep Date:** 6/28/2005**Analyst:** RW

Percent Moisture	17.9	0.01		wt%	1	6/29/2005
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Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 04, 2005

Date Printed: July 04, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441, Forrestal Village, Great Lakes, IL Lab Order: 0506810

Lab ID: 0506810-005 Collection Date: 6/23/2005 11:05:00 AM
Client Sample ID: SB11 4.5' Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
BTEX by GC/MS	SW5035/8260B					Prep Date: 6/29/2005 Analyst: PS
Benzene	ND	0.0024		mg/Kg-dry	1	7/1/2005
Toluene	0.0028	0.0024		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.0024		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.0072		mg/Kg-dry	1	7/1/2005
Methyl tert-butyl ether	ND	0.0024		mg/Kg-dry	1	7/1/2005
Percent Moisture	D2974					Prep Date: 6/28/2005 Analyst: RW
Percent Moisture	12.2	0.01	*	wt%	1	6/29/2005

Lab ID: 0506810-006 Collection Date: 6/23/2005 11:50:00 AM
Client Sample ID: SB12 6.5' Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
BTEX by GC/MS	SW5035/8260B					Prep Date: 6/29/2005 Analyst: PS
Benzene	ND	0.003		mg/Kg-dry	1	7/1/2005
Toluene	ND	0.003		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.003		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.009		mg/Kg-dry	1	7/1/2005
Methyl tert-butyl ether	ND	0.003		mg/Kg-dry	1	7/1/2005
Percent Moisture	D2974					Prep Date: 6/28/2005 Analyst: RW
Percent Moisture	12.9	0.01	*	wt%	1	6/29/2005

Lab ID: 0506810-007 Collection Date: 6/23/2005 12:15:00 PM
Client Sample ID: SB13 6' Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
BTEX by GC/MS	SW5035/8260B					Prep Date: 6/29/2005 Analyst: PS
Benzene	ND	0.0032		mg/Kg-dry	1	7/1/2005
Toluene	ND	0.0032		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.0032		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.0095		mg/Kg-dry	1	7/1/2005
Methyl tert-butyl ether	ND	0.0032		mg/Kg-dry	1	7/1/2005
Percent Moisture	D2974					Prep Date: 6/28/2005 Analyst: RW
Percent Moisture	11.6	0.01	*	wt%	1	6/29/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 04, 2005

Date Printed: July 04, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441, Forrestal Village, Great Lakes, IL

Lab Order: 0506810

Lab ID: 0506810-008

Collection Date: 6/23/2005 12:40:00 PM

Client Sample ID: SB14 6.5'

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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BTEX by GC/MS

SW5035/8260B

Prep Date: 6/29/2005 Analyst: PS

Benzene	ND	0.0038		mg/Kg-dry	1	7/1/2005
Toluene	0.0043	0.0038		mg/Kg-dry	1	7/1/2005
Ethylbenzene	ND	0.0038		mg/Kg-dry	1	7/1/2005
Xylenes, Total	ND	0.011		mg/Kg-dry	1	7/1/2005
Methyl tert-butyl ether	ND	0.0038		mg/Kg-dry	1	7/1/2005

Percent Moisture

D2974

Prep Date: 6/28/2005 Analyst: RW

Percent Moisture	12.3	0.01	*	wt%	1	6/29/2005
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Lab ID: 0506810-009

Collection Date: 6/23/2005 2:00:00 PM

Client Sample ID: SB13GW

Matrix: Water

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Volatile Organic Compounds by GC/MS

SW8260B (SW5030B)

Prep Date: Analyst: PS

Benzene	ND	0.005		mg/L	1	7/1/2005
Ethylbenzene	ND	0.005		mg/L	1	7/1/2005
Methyl tert-butyl ether	ND	0.005		mg/L	1	7/1/2005
Toluene	ND	0.005		mg/L	1	7/1/2005
Xylenes, Total	ND	0.015		mg/L	1	7/1/2005

Lab ID: 0506810-010

Collection Date: 6/23/2005 2:50:00 PM

Client Sample ID: 3160D 2"

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 6/29/2005 Analyst: JG

Lead	170	0.51		mg/Kg-dry	10	6/29/2005
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Percent Moisture

D2974

Prep Date: 6/28/2005 Analyst: RW

Percent Moisture	4.32	0.01	*	wt%	1	6/29/2005
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Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: July 04, 2005

Date Printed: July 04, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441, Forrestal Village, Great Lakes, IL

Lab Order: 0506810

Lab ID: 0506810-011

Collection Date: 6/23/2005 2:55:00 PM

Client Sample ID: 3156D 2"

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)					
Lead	110	0.52		mg/Kg-dry	10	Prep Date: 6/29/2005 Analyst: JG 6/29/2005
Percent Moisture	D2974					
Percent Moisture	6.01	0.01	*	wt%	1	Prep Date: 6/28/2005 Analyst: RW 6/29/2005

Lab ID: 0506810-012

Collection Date: 6/23/2005 3:15:00 PM

Client Sample ID: 3028G 2"

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)					
Lead	87	0.58		mg/Kg-dry	10	Prep Date: 6/29/2005 Analyst: JG 6/29/2005
Percent Moisture	D2974					
Percent Moisture	13.7	0.01	*	wt%	1	Prep Date: 6/28/2005 Analyst: RW 6/29/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

CHAIN OF CUSTODY RECORD

Nº: 809242

Page : of

[illegible]

Sample Receipt Checklist

Client Name **MACTEC**

Date and Time Received:

06/24/2005

Work Order Number **0506810**

Received by: **JC**

Checklist completed by:

Jesus Cant
Signature

6/24/05
Date

Reviewed by:

cc
Initials

7/4/05
Date

Matrix

Carrier name **STAT Analysis**

Shipping container/cooler in good condition?

Yes ☒

No ☐

Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☐

No ☐

Not Present ☒

Custody seals intact on sample bottles?

Yes ☐

No ☐

Not Present ☒

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels?

Yes ☒

No ☐

Samples in proper container/bottle?

Yes ☒

No ☐

Sample containers intact?

Yes ☒

No ☐

Sufficient sample volume for indicated test?

Yes ☒

No ☐

All samples received within holding time?

Yes ☒

No ☐

Container or Temp Blank temperature in compliance?

Yes ☒

No ☐

Temperature **5 °C**

Water - VOA vials have zero headspace?

No VOA vials submitted ☐

Yes ☐

No ☒

Water - Samples properly preserved/ pH checked?

Yes ☐

No ☐

Adjusted? _____

Checked by _____

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted _____

Date contacted: _____

Person contacted _____

Contacted by: _____

Regarding _____

Comments:

Head space was present in sample SB136W (1 and 2).

Corrective Action _____

STAT Analysis Corporation

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August 08, 2005

MACTEC Engineering and Consulting, Inc.

5440 N. Cumberland Avenue

Suite 250

Chicago, IL 60656

Telephone: (312) 617-8575

Fax: (312) 491-9716

RE: 3205050441-01, NAVFAC-Great Lakes

STAT Project No: 0508030

Dear Dennis Nagg:

STAT Analysis received 23 samples for the referenced project on 8/1/2005. The analytical results are presented in the following report.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAC standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 563-0371.

Sincerely,



Craig Chawla

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory.

Client: MACTEC Engineering and Consulting, Inc.
Project: 3205050441-01, NAVFAC-Great Lakes
Lab Order: 0508030

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
0508030-001A	K-1		7/29/2005 10:45:00 AM	8/1/2005
0508030-002A	K-2		7/29/2005 10:50:00 AM	8/1/2005
0508030-003A	D-1		7/29/2005 11:10:00 AM	8/1/2005
0508030-004A	D-2		7/29/2005 11:15:00 AM	8/1/2005
0508030-005A	I-1		7/29/2005 11:30:00 AM	8/1/2005
0508030-006A	I-2		7/29/2005 11:35:00 AM	8/1/2005
0508030-007A	I-3		7/29/2005 11:40:00 AM	8/1/2005
0508030-008A	I-4		7/29/2005 11:45:00 AM	8/1/2005
0508030-009A	I-5		7/29/2005 11:50:00 AM	8/1/2005
0508030-010A	I-6		7/29/2005 11:55:00 AM	8/1/2005
0508030-011A	I-7		7/29/2005 12:00:00 PM	8/1/2005
0508030-012A	64-1		7/29/2005 12:20:00 PM	8/1/2005
0508030-013A	64-2		7/29/2005 12:25:00 PM	8/1/2005
0508030-014A	64-3		7/29/2005 12:30:00 PM	8/1/2005
0508030-015A	64-4		7/29/2005 12:35:00 PM	8/1/2005
0508030-016A	64-5		7/29/2005 12:40:00 PM	8/1/2005
0508030-017A	209-1		7/29/2005 1:15:00 PM	8/1/2005
0508030-018A	204H-1		7/29/2005 1:30:00 PM	8/1/2005
0508030-019A	202H-1		7/29/2005 1:50:00 PM	8/1/2005
0508030-020A	202H-2		7/29/2005 1:55:00 PM	8/1/2005
0508030-021A	202H-3		7/29/2005 2:00:00 PM	8/1/2005
0508030-022A	202H-4		7/29/2005 2:05:00 PM	8/1/2005
0508030-023A	202H-5		7/29/2005 2:10:00 PM	8/1/2005

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: August 08, 2005

Date Printed: August 08, 2005

Client: MACTEC Engineering and Consulting, Inc
Project: 3205050441-01, NAVFAC-Great Lakes**Lab Order:** 0508030**Lab ID:** 0508030-001**Collection Date:** 7/29/2005 10:45:00 AM**Client Sample ID:** K-1**Matrix:** Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Metals by ICP/MS	SW6020 (SW3050B)					Prep Date: 8/3/2005 Analyst: JG
Lead	7000	5.4		mg/Kg-dry	100	8/4/2005

Percent Moisture	D2974					Prep Date: 8/3/2005 Analyst: ASM
Percent Moisture	13.3	0.01	*	wt%	1	8/4/2005

Lab ID: 0508030-002**Collection Date:** 7/29/2005 10:50:00 AM**Client Sample ID:** K-2**Matrix:** Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Metals by ICP/MS	SW6020 (SW3050B)					Prep Date: 8/3/2005 Analyst: JG
Lead	7300	5.5		mg/Kg-dry	100	8/4/2005

Percent Moisture	D2974					Prep Date: 8/3/2005 Analyst: ASM
Percent Moisture	9.09	0.01	*	wt%	1	8/4/2005

Lab ID: 0508030-003**Collection Date:** 7/29/2005 11:10:00 AM**Client Sample ID:** D-1**Matrix:** Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Metals by ICP/MS	SW6020 (SW3050B)					Prep Date: 8/3/2005 Analyst: JG
Lead	1200	0.52		mg/Kg-dry	10	8/3/2005

Percent Moisture	D2974					Prep Date: 8/3/2005 Analyst: ASM
Percent Moisture	6.73	0.01	*	wt%	1	8/4/2005

Lab ID: 0508030-004**Collection Date:** 7/29/2005 11:15:00 AM**Client Sample ID:** D-2**Matrix:** Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
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Metals by ICP/MS	SW6020 (SW3050B)					Prep Date: 8/3/2005 Analyst: JG
Lead	1400	1.4		mg/Kg-dry	20	8/3/2005

Percent Moisture	D2974					Prep Date: 8/3/2005 Analyst: ASM
Percent Moisture	31.2	0.01	*	wt%	1	8/4/2005

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: August 08, 2005

Date Printed: August 08, 2005

Client:	MACTEC Engineering and Consulting, Inc					
Project:	3205050441-01, NAVFAC-Great Lakes			Lab Order:	0508030	
Lab ID:	0508030-005			Collection Date:	7/29/2005 11:30:00 AM	
Client Sample ID:	I-1			Matrix:	Soil	
Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)			Prep Date:	8/3/2005	Analyst: JG
Lead	3100	2.2		mg/Kg-dry	20	8/3/2005
Percent Moisture	D2974			Prep Date:	8/3/2005	Analyst: ASM
Percent Moisture	53.8	0.01	*	wt%	1	8/4/2005
Lab ID:	0508030-006			Collection Date:	7/29/2005 11:35:00 AM	
Client Sample ID:	I-2			Matrix:	Soil	
Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)			Prep Date:	8/3/2005	Analyst: JG
Lead	5600	1.5		mg/Kg-dry	20	8/3/2005
Percent Moisture	D2974			Prep Date:	8/3/2005	Analyst: ASM
Percent Moisture	36.1	0.01	*	wt%	1	8/4/2005
Lab ID:	0508030-007			Collection Date:	7/29/2005 11:40:00 AM	
Client Sample ID:	I-3			Matrix:	Soil	
Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)			Prep Date:	8/3/2005	Analyst: JG
Lead	5300	1.8		mg/Kg-dry	20	8/3/2005
Percent Moisture	D2974			Prep Date:	8/3/2005	Analyst: ASM
Percent Moisture	46.4	0.01	*	wt%	1	8/4/2005
Lab ID:	0508030-008			Collection Date:	7/29/2005 11:45:00 AM	
Client Sample ID:	I-4			Matrix:	Soil	
Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)			Prep Date:	8/3/2005	Analyst: JG
Lead	4300	1.8		mg/Kg-dry	20	8/3/2005
Percent Moisture	D2974			Prep Date:	8/3/2005	Analyst: ASM
Percent Moisture	45.4	0.01	*	wt%	1	8/4/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT Analysis Corporation

2255 West Harrison St., Suite B, Chicago, IL 60612-3505

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: August 08, 2005

Date Printed: August 08, 2005

Client: MACTEC Engineering and Consulting, Inc

Project: 3205050441-01, NAVFAC-Great Lakes

Lab Order: 0508030

Lab ID: 0508030-009

Collection Date: 7/29/2005 11:50:00 AM

Client Sample ID: I-5

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

13000

3

mg/Kg-dry

50

8/3/2005

Percent Moisture

D2974

Prep Date: 8/3/2005

Analyst: ASM

Percent Moisture

20.1

0.01

wt%

1

8/4/2005

Lab ID: 0508030-010

Collection Date: 7/29/2005 11:55:00 AM

Client Sample ID: I-6

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

8500

1.7

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/3/2005

Analyst: ASM

Percent Moisture

45.1

0.01

wt%

1

8/4/2005

Lab ID: 0508030-011

Collection Date: 7/29/2005 12:00:00 PM

Client Sample ID: I-7

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

1800

1.3

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/3/2005

Analyst: ASM

Percent Moisture

27.6

0.01

wt%

1

8/4/2005

Lab ID: 0508030-012

Collection Date: 7/29/2005 12:20:00 PM

Client Sample ID: 64-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

520

1.3

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/3/2005

Analyst: ASM

Percent Moisture

26.4

0.01

wt%

1

8/4/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: August 08, 2005

Date Printed: August 08, 2005

Client: MACTEC Engineering and Consulting, Inc

Project: 3205050441-01, NAVFAC-Great Lakes

Lab Order: 0508030

Lab ID: 0508030-013

Collection Date: 7/29/2005 12:25:00 PM

Client Sample ID: 64-2

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

1000

3

mg/Kg-dry

50

8/8/2005

Percent Moisture

D2974

Prep Date: 8/3/2005

Analyst: ASM

Percent Moisture

17.9

0.01

wt%

1

8/4/2005

Lab ID: 0508030-014

Collection Date: 7/29/2005 12:30:00 PM

Client Sample ID: 64-3

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

97

1

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/3/2005

Analyst: ASM

Percent Moisture

7.76

0.01

wt%

1

8/4/2005

Lab ID: 0508030-015

Collection Date: 7/29/2005 12:35:00 PM

Client Sample ID: 64-4

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

530

1.4

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/3/2005

Analyst: ASM

Percent Moisture

32.1

0.01

wt%

1

8/4/2005

Lab ID: 0508030-016

Collection Date: 7/29/2005 12:40:00 PM

Client Sample ID: 64-5

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/5/2005

Analyst: JG

Lead

600

0.56

mg/Kg-dry

10

8/5/2005

Percent Moisture

D2974

Prep Date: 8/4/2005

Analyst: PMS

Percent Moisture

10.4

0.01

wt%

1

8/5/2005

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: August 08, 2005

Date Printed: August 08, 2005

Client: MACTEC Engineering and Consulting, Inc

Project: 3205050441-01, NAVFAC-Great Lakes

Lab Order: 0508030

Lab ID: 0508030-017

Collection Date: 7/29/2005 1:15:00 PM

Client Sample ID: 209-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

290

1.2

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/4/2005

Analyst: PMS

Percent Moisture

18.1

0.01

wt%

1

8/5/2005

Lab ID: 0508030-018

Collection Date: 7/29/2005 1:30:00 PM

Client Sample ID: 204H-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

1100

1.1

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/4/2005

Analyst: PMS

Percent Moisture

17.2

0.01

wt%

1

8/5/2005

Lab ID: 0508030-019

Collection Date: 7/29/2005 1:50:00 PM

Client Sample ID: 202H-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

1300

1.3

mg/Kg-dry

20

8/3/2005

Percent Moisture

D2974

Prep Date: 8/4/2005

Analyst: PMS

Percent Moisture

24.1

0.01

wt%

1

8/5/2005

Lab ID: 0508030-020

Collection Date: 7/29/2005 1:55:00 PM

Client Sample ID: 202H-2

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

Metals by ICP/MS

SW6020 (SW3050B)

Prep Date: 8/3/2005

Analyst: JG

Lead

14000

3.2

mg/Kg-dry

50

8/3/2005

Percent Moisture

D2974

Prep Date: 8/4/2005

Analyst: PMS

Percent Moisture

25.0

0.01

wt%

1

8/5/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: August 08, 2005

Date Printed: August 08, 2005

Client: MACTEC Engineering and Consulting, Inc

Project: 3205050441-01, NAVFAC-Great Lakes

Lab Order: 0508030

Lab ID: 0508030-021

Collection Date: 7/29/2005 2:00:00 PM

Client Sample ID: 202H-3

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)					
Lead	750	2.4		mg/Kg-dry	40	Prep Date: 8/4/2005 Analyst: JG 8/4/2005
Percent Moisture	D2974					
Percent Moisture	20.6	0.01	*	wt%	1	Prep Date: 8/4/2005 Analyst: PMS 8/5/2005

Lab ID: 0508030-022

Collection Date: 7/29/2005 2:05:00 PM

Client Sample ID: 202H-4

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)					
Lead	2100	2.2		mg/Kg-dry	40	Prep Date: 8/4/2005 Analyst: JG 8/4/2005
Percent Moisture	D2974					
Percent Moisture	9.21	0.01	*	wt%	1	Prep Date: 8/4/2005 Analyst: PMS 8/5/2005

Lab ID: 0508030-023

Collection Date: 7/29/2005 2:10:00 PM

Client Sample ID: 202H-5

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)					
Lead	1300	2		mg/Kg-dry	40	Prep Date: 8/4/2005 Analyst: JG 8/4/2005
Percent Moisture	D2974					
Percent Moisture	5.36	0.01	*	wt%	1	Prep Date: 8/4/2005 Analyst: PMS 8/5/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

STAT

Analysis Corporation

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e-mail address: STATinfo@STATAnalysis.com AIHA 10248, NVLAP 101202-0, NEALP 100445

CHAIN OF CUSTODY RECORD

N^o: 810369

Page: 1 of 2

Company: MACTEC EHC							P.O. No.:	
Project Number: 3205 05 0441-01 Client Tracking No.:							Quote No.:	
Project Name: NAVFAC - Great Lakes								
Location/Address: Great Lakes, IL								
Sampler(s): Andrew Hastings								
Report To: Dennis Nagg Phone: 773-693-6630								
QC Level: 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> Fax: 773-693-6039								
Regulatory Program: NPEDS/MWRD RCRA SDWA SRP TACO Other:								
Client Sample Number/Description:							Turn Around:	
Date Taken							Results Needed:	
Time Taken							8/8/05	
Matrix							ampm	
Comp							Standard	
Grab							Total Lead	
Preserv.								
No. of Containers								
K-1							001	
K-2							002	
D-1							003	
D-2							004	
I-1							005	
I-2							006	
I-3							007	
I-4							008	
I-5							009	
I-6							010	
I-7							011	
64-1							012	
64-2							013	
64-3							014	
64-4							015	
64-5							016	
209-1							017	
204H-1							018	
202H-1							019	
202H-2							020	
Relinquished by: (Signature) <i>Andrew Hastings</i>							Laboratory Use:	
Received by: (Signature) <i>John Cant</i>							Sample Verification:	
Relinquished by: (Signature) <i>John Cant</i>							Work Order No. 0508030	
Received for lab by: (Signature) <i>John Cant</i>							Preservation Code:	
Relinquished by: (Signature) <i>John Cant</i>							A = None B = HNO ₃ C = NaOH	
Date/Time: 8/10/05 4:00							D = H ₂ SO ₄ E = HCl F = 5035/EnCore	
Date/Time: 8/10/05 12:30								
Date/Time: 8/10/05 12:30								
Date/Time: 8/10/05 12:30								

2255 W Harrison St., Suite B, Chicago, Illinois 60612 Phone: (312) 733-0551 Fax: (312) 733-2386
e-mail address: STATinfo@STATAnalysis.com AIHA 10248, NVLAP 101202-0, NEALP 100445

CHAIN OF CUSTODY RECORD

Nº: 810370

Page : 2 of 2

[illegible]

Sample Receipt Checklist

Client Name **MACTEC**

Date and Time Received:

08/01/2005

Work Order Number **0508030**

Received by: **JC**

Checklist completed by:

Jesus Cant 8/1/05
Signature Date

Reviewed by:

ce 8/1/05
Initials Date

Matrix

Carrier name **STAT Analysis**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Cooler seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Cooler seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature 6 °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Water - Samples properly preserved/ pH checked?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	

Adjusted? _____

Checked by _____

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted _____

Date contacted: _____

Person contacted _____

Contacted by: _____

Regarding _____

Comments: _____

Corrective Action _____

STAT Analysis Corporation

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

August 26, 2005

MACTEC Engineering and Consulting, Inc.

5440 N. Cumberland Avenue

Suite 250

Chicago, IL 60656

Telephone: (312) 617-8575

Fax: (312) 491-9716

RE: NAVFAC

STAT Project No: 0508828

Dear Dennis Nagg:

STAT Analysis received 12 samples for the referenced project on 8/23/2005. The analytical results are presented in the following report.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAC standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 563-0371.

Sincerely,



Craig Chawla

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory.

Client: MACTEC Engineering and Consulting, Inc.
Project: NAVFAC
Lab Order: 0508828

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
0508828-001A	642-Pb-1		7/18/2005 12:25:00 PM	7/19/2005
0508828-002A	657-Pb-1		7/18/2005 1:03:00 PM	7/19/2005
0508828-003A	495-Pb-1		7/19/2005 9:35:00 AM	7/19/2005
0508828-004A	447-Pb-1		7/19/2005 9:37:00 AM	7/19/2005
0508828-005A	423-Pb-2		7/19/2005 10:08:00 AM	7/19/2005
0508828-006A	422-Pb-1		7/19/2005 10:26:00 AM	7/19/2005
0508828-007A	426-Pb-2		7/19/2005 10:30:00 AM	7/19/2005
0508828-008A	K-1		7/29/2005 10:45:00 AM	8/1/2005
0508828-009A	I-1		7/29/2005 11:30:00 AM	8/1/2005
0508828-010A	I-6		7/29/2005 11:55:00 AM	8/1/2005
0508828-011A	64-2		7/29/2005 12:25:00 PM	8/1/2005
0508828-012A	202H-2		7/29/2005 1:55:00 PM	8/1/2005

CLIENT: MACTEC Engineering and Consulting, Inc.
Project: NAVFAC
Lab Order: 0508828

CASE NARRATIVE

Sample 642-Pb-1 (0508828-001) was formerly assigned STAT Sample ID 0507586-001.
Sample 657-Pb-1 (0508828-002) was formerly assigned STAT Sample ID 0507586-009.
Sample 495-Pb-1 (0508828-003) was formerly assigned STAT Sample ID 0507584-002.
Sample 447-Pb-1 (0508828-004) was formerly assigned STAT Sample ID 0507584-003.
Sample 642-Pb-1 (0508828-005) was formerly assigned STAT Sample ID 0507584-007.
Sample 422-Pb-1 (0508828-006) was formerly assigned STAT Sample ID 0507584-016.
Sample 426-Pb-2 (0508828-007) was formerly assigned STAT Sample ID 0507584-020.
Sample K-1 (0508828-008) was formerly assigned STAT Sample ID 0508030-001.
Sample I-1 (0508828-009) was formerly assigned STAT Sample ID 0508030-005.
Sample I-6 (0508828-010) was formerly assigned STAT Sample ID 0508030-010.
Sample 64-2 (0508828-011) was formerly assigned STAT Sample ID 0508030-013.
Sample 202H-2 (0508828-012) was formerly assigned STAT Sample ID 0508030-020.

Please refer to reports corresponding to original STAT Sample ID for chains of custody.

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Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: August 26, 2005

Date Printed: August 26, 2005

Client: MACTEC Engineering and Consulting, Inc.

Project: NAVFAC

Lab Order: 0508828

Lab ID: 0508828-001

Collection Date: 7/18/2005 12:25:00 PM

Client Sample ID: 642-Pb-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005

Analyst: JG

Lead

4.3

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-002

Collection Date: 7/18/2005 1:03:00 PM

Client Sample ID: 657-Pb-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005

Analyst: JG

Lead

0.077

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-003

Collection Date: 7/19/2005 9:35:00 AM

Client Sample ID: 495-Pb-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005

Analyst: JG

Lead

11

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-004

Collection Date: 7/19/2005 9:37:00 AM

Client Sample ID: 447-Pb-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005

Analyst: JG

Lead

8.2

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-005

Collection Date: 7/19/2005 10:08:00 AM

Client Sample ID: 423-Pb-2

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005

Analyst: JG

Lead

4.2

0.005

mg/L

5

8/26/2005

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: August 26, 2005

Date Printed: August 26, 2005

Client: MACTEC Engineering and Consulting, Inc

Project: NAVFAC

Lab Order: 0508828

Lab ID: 0508828-006

Collection Date: 7/19/2005 10:26:00 AM

Client Sample ID: 422-Pb-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005 Analyst: JG

Lead

6.9

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-007

Collection Date: 7/19/2005 10:30:00 AM

Client Sample ID: 426-Pb-2

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005 Analyst: JG

Lead

6.1

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-008

Collection Date: 7/29/2005 10:45:00 AM

Client Sample ID: K-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005 Analyst: JG

Lead

9.6

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-009

Collection Date: 7/29/2005 11:30:00 AM

Client Sample ID: I-1

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005 Analyst: JG

Lead

2.2

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-010

Collection Date: 7/29/2005 11:55:00 AM

Client Sample ID: I-6

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005 Analyst: JG

Lead

4.6

0.005

mg/L

5

8/26/2005

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- HT - Sample received past holding time
- * - Non-accredited parameter

- RL - Reporting / Quantitation Limit for the analysis
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range
- H - Holding time exceeded

STAT Analysis Corporation

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Accreditation Numbers: IEPA ELAP 100445; ORELAP IL300001; AIHA 10248; NVLAP LabCode 101202-0

Date Reported: August 26, 2005

Date Printed: August 26, 2005

Client: MACTEC Engineering and Consulting, Inc

Project: NAVFAC

Lab Order: 0508828

Lab ID: 0508828-011

Collection Date: 7/29/2005 12:25:00 PM

Client Sample ID: 64-2

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005 Analyst: JG

Lead

5.4

0.005

mg/L

5

8/26/2005

Lab ID: 0508828-012

Collection Date: 7/29/2005 1:55:00 PM

Client Sample ID: 202H-2

Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
----------	--------	----	-----------	-------	----	---------------

TCLP Metals by ICP/MS

SW1311/6020 (SW3005A)

Prep Date: 8/25/2005 Analyst: JG

Lead

1

0.005

mg/L

5

8/26/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

Craig

0508828

From: "Nagg, Dennis" <DENAGG@mactec.com>
To: "Craig Chawla" <CChawla@STATAnalysis.com>
Sent: Wednesday, August 17, 2005 4:54 PM
Subject: Soil Samples NAVFAC
Craig:

Please run the following soil samples for arsenic on standard TAT:

- 1) 0507475-019 (VES#3-A)
- 2) 0507475-021 (VES#3-C)
- 3) 0507475-023 (VES#3-E)

Also, please run the following soil samples for TCLP Lead on standard TAT:

- 1) 0507586-001 (642-Pb-1)
- 2) 0507586-009 (657-Pb-1)
- 3) 0507584-002 (495-Pb-1)
- 4) 0507584-003 (447-Pb-1)
- 5) 0507584-007 (423-Pb-2)
- 6) 0507584-016 (422-Pb-1)
- 7) 0507584-020 (426-Pb-2)
- 8) 0508030-001 (K-1)
- 9) 0508030-005 (I-1)
- 10) 0508030-010 (I-6)
- 11) 0508030-013 (64-2)
- 12) 0508030-020 (202H-2)

Please try to have these results to me by 8/25/05.

Dennis E. Nagg | Sr Project Engineer
MACTEC Engineering and Consulting, Inc.
5440 N. Cumberland Ave. | Suite 250 | Chicago, IL | 60656
Office (773) 693-6030 | Fax (773) 693-6039
Email denagg@mactec.com | Web www.mactec.com

8/22/2005

Appendix D
Radiological Survey Report

DRAFT

**FORRESTAL VILLAGE
PHASED-APPROACH RADIOLOGICAL SURVEY
REPORT**

**IN SUPPORT OF THE PHASE II
ENVIRONMENTAL SITE ASSESSMENT
NAVSTA GREAT LAKES
NAVAL REGION MIDWEST FAMILY
HOUSING PRIVATIZATION**

Prepared for:

Forest City Washington
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Prepared by:

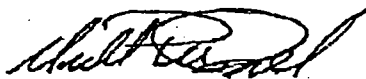


MACTEC Development Corporation
751 Horizon Court, Suite 104
Grand Junction, CO 81506

December 8, 2005

SIGNATURES

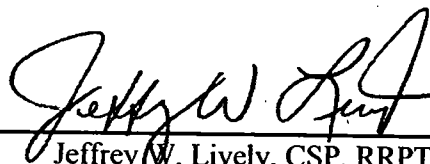
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Michael McDonald, CHP, RRPT
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Date: 12/08/05

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ACRONYMS

bgs	below grade surface
CFR	Code of Federal Regulations
CoC	Chain of Custody
cpm	counts per minute
CRDL	Contract Required Detection Limit
CT	Central Tendency
CV	Coefficient of Variation
ESA	Environmental Site Assessment
FR	Federal Register
ft.	feet
IR	Installation Restoration
IRASR	Interim Radiological Assessment Survey Report
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mrem/y	milli rem per year
mSv/y	milli Sievert per year
NaI	Sodium Iodide
NAVSTA	Naval Station
NAVFAC	Naval Facility
NIST	National Institute for Standards and Technology
NORM	Naturally Occurring Radioactive Material
pCi/g	pico Curies per gram
QA	Quality Assurance
QC	Quality Control
Ra	radium
PARS	Phased-Approach Radiological Survey
STL	Severn Trent Laboratories
Th	thorium
U	uranium
USDOE	United States Department of Energy
USNRC	United States Nuclear Regulatory Commission

1.0 BACKGROUND INFORMATION

MACTEC Engineering and Consulting, Inc. (MACTEC) was contracted by Forest City Washington (Forest City) to perform a Phase II Environmental Site Assessment (ESA) at residential portions of the NAVSTA Great Lakes facility in Great Lakes, Illinois (subject property). This Phased-Approach Radiological Survey (PARS) Report supplements and supports the objectives of the Phase II ESA, documents radiological surveys performed during the Phase II ESA, and presents findings and conclusions with regard to radiological impacts at the Forrestal Village site.

The NAVSTA Great Lakes facility totals more than 1,600 acres of land. The NAVSTA Great Lakes has been in operation since 1911 to support naval training including the Corp School, the Recruit Training Command, and the Training Support Center. The subject of this PARS Report is the portion of NAVSTA Great Lakes that comprises the residential housing area at Forrestal Village. The housing area at Forrestal Village (excluding Supplyside) is approximately 400 acres in size.

The purpose of the Phase II ESA was to determine potential environmental impacts to the subject property from conditions identified during a document review and a Phase I Environmental Site Assessment (Phase I ESA) performed by MACTEC. The scope of work performed for this Phase II ESA is based on the findings of document review performed by MACTEC prior to the Phase I ESA. As part of the document review, it was determined that Phase II ESA radiological assessment activities were warranted on a portion of the Forrestal Village neighborhood property due to its proximity to designated Installation Restoration (IR) Sites 18 and 20.

Consequently, MACTEC performed a preliminary screening of an area east of Mississippi Street. Elevated radiological readings were detected during the preliminary screening which prompted MACTEC to recommend and perform a more thorough interim radiological assessment. This additional interim assessment confirmed the previously detected elevated radiological readings and MACTEC issued the Interim Radiological Assessment Survey (*Interim Radiological Assessment Survey Report*, MACTEC Development Corporation, September 19, 2005). Based on the survey and the conclusions presented in that report, additional phased radiological surveys were performed in the areas of concern. This PARS Report documents the results of these surveys and conclusions with regard to radiological impacts at the Forrestal Village site.

1.1 Description of Radiologically Impacted Installation Restoration Sites

A former Monazite sand storage area (IR Site 18) and an area of radium-contaminated soil (IR Site 20) are present on Supplyside, west of Forrestal Village near Buildings 3214 and 3215. Although these sites are west of the boundary of the subject property, the proximity of these sites to the proposed housing units warranted Phase II ESA investigation activities. Based on information from MACTEC's document review for their Phase I ESA and Phase II ESA, elevated levels of thorium 232 (from the Monazite sand) and radium 226 (from the recycled metals) were detected in soils in these areas.

During the 1950s through the 1980s, the Defense Reutilization Material Office maintained a yard for recycled metals. The operation consisted of crushing and sending scrap metal to a recycler. The recycled metals included radium-containing equipment. It is possible that radium-containing equipment remains buried in this area. Elevated levels of radium in the soil were found to be at 750,000 counts per minute (cpm), while background is 5,000 cpm.

According to the report entitled *Draft Work Plan for Radiological Remediation and Final Status Survey at Great Lakes Naval Training Center, Great Lakes, Illinois*, dated November 21, 2001, prepared by Cabrera Services, Inc. (Cabrera), this area was used to store Monazite sand, a thorium-bearing material. The Monazite Sand Area was investigated by the USNRC and Cabrera. According to the *Environmental Baseline Survey, Public / Private Venture Housing Privatization, Naval Station Great Lakes, Great Lakes, Illinois* prepared for NAVAL Facilities Engineering Command, Southern Division, North Charleston, South Carolina, dated March 2004, the radium-contaminated Soil Area is undergoing remediation. During the performance of the Phase II ESA, NAVFAC personnel verbally indicated that Cabrera was continuing the remediation of these areas, and also indicated that some of the Monazite sand material could have been used as fill material at an outfall on the west side of Skokie Ditch.

1.2 Preliminary Screening Survey

To evaluate the impact of these radioactive isotopes on the subject property, MACTEC conducted a preliminary radiation screening survey of the subject property east of these areas and Mississippi Avenue. The preliminary radiation screening survey was conducted on July 29, 2005. The area evaluated in the preliminary screening survey is located along the eastern edge of Mississippi Avenue north of the intersection of Wyoming Avenue and in an open field located south of West Colorado Avenue. This open field contained a storm-water drainage outfall on the west side of Skokie Ditch. NAVFAC personnel had identified this outfall as an area where Monazite sand was potentially used as fill. Given the location of the outfall structure, it also appeared that the pipe connected to this outfall would convey storm-water from the identified Monazite sand and radium-contaminated soil areas. MACTEC found elevated gross gamma radiation levels near the outfall of the storm-water drainage feature.

1.3 Interim Radiological Assessment Survey

Due to the identification of elevated radioactivity east of Mississippi Avenue near the storm-water collection system outfall at the Skokie Ditch during the preliminary screening survey, MACTEC conducted a more thorough interim radiological assessment survey of the area during the period of September 6 through September 8, 2005.

As presented in the *Interim Radiological Assessment Survey Report*, gross gamma radiation measurements of surface soils within the survey area indicated elevated

concentrations of radioactivity in the existing residential area near Vermont Court up to 8.5 times the measured background value. Gross gamma radiation measurements in the soils backfilled around the concrete abutment at the outfall of the storm-drain system as it enters Skokie Ditch indicated upwards of 15 times the measured background value. Soil samples collected from the soils surrounding the outfall structure confirmed that concentrations of thorium radioactivity were more than 37 times the USNRC's published surface soil screening value of 1.1 pCi/g (U.S. Federal Register, Volume 64, No. 234, page 68396, dated December 7, 1999.)

MACTEC concluded in that report that the subject property was impacted by elevated concentrations of radioactive material (elevated concentrations of thorium 232) and that the deposition mechanism for these materials appeared to be most likely from the use of Monazite sands as fill material and not through natural environmental transport processes. MACTEC raised a concern that such concentrations might be more widespread throughout the subject property and recommended that additional radiological surveys of additional potentially impacted property be performed to determine whether additional radiological impacts were present at the Forrestal Village property.

1.4 Phased-Approach Radiological Survey

Due to the identification of localized elevated soil radioactivity east of Mississippi Avenue., near the storm-water collection system outfall at the Skokie Ditch, and in the Vermont Court residential area, MACTEC determined that a more thorough radiological survey of adjacent land areas, extending outward from the impacted storm-water outfall location, moving to the east and south, should be performed in a phased-approach by nuclear radiation professionals. This phased-approach survey was conducted to identify additional impact locations within the Forrestal Village housing area, while maximizing the efficiency of the survey approach.

This PARS Report documents the activities performed during the phased-approach radiological survey and presents findings and conclusions with regard to environmental impacts at the site. Soil and material samples were collected at some locations with identified radiological impacts. These samples were submitted to an analytical laboratory for assay. All of the analytical data has not been received from the contracted laboratory; thus, this report is presented as a draft. A final report will be issued upon receiving the final analysis results from the laboratory.

The purpose of the radiological survey discussed in this report was to identify, locate, and qualitatively measure impacted areas in a phased-approach and to obtain volumetric soil samples from identified impacted areas for quantitative laboratory radioanalysis via alpha and gamma spectroscopy analyses. Based upon its proximity to IR Sites 18 and 20 and the previous results obtained from the preliminary screening survey and interim radiological assessment survey, it was concluded that expansion of the radiological survey was warranted. The scope of work performed for this radiological survey

included a walk-over gamma radiation survey of the ground surface and laboratory analysis of volumetric soil samples collected at impacted areas. The survey was conducted between November 11 through November 21, 2005, and included three independent phase areas. All of the numbered survey areas (1-21, 24, 25, and 26) and the three survey phases (Phases 1-3) at Forrestal Village are shown in Figure 1.

2.0 SURVEY APPROACH

The radiological survey was designed to locate areas of elevated residual radioactivity, qualitatively measure the gamma emission from the impact area (in cpm), and quantitatively assess the concentrations of radiological constituents at selected impact areas (in pCi/g).

The initial Phase 1 survey areas are to the east and south of the sites identified by the Navy as IR sites 18 and 20, and also east and south of the outfall area identified during the interim radiological assessment survey performed by MACTEC. Phase 1 survey location boundaries were selected based on the assumption that additional radiological impacts from the Monazite sand storage area, due to dispersion of the sand as a fill material, would be more likely to be concentrated in those areas closer to the source. In the phased-approach, additional survey areas would be added, if needed, to further locate radiological anomalies should they be encountered in a previous phase. Phase 2 and 3 Survey Areas were added to the scope of the survey during the performance of the survey. The addition of Survey Areas 17-25 (Phase 2) became necessary after elevated residual radioactivity was identified in Phase 1 Survey Areas, especially those located east of Great Lakes Road. The addition of Survey Area 26 (Phase 3) became necessary after elevated residual radioactivity was identified in the very southeast corner of the Forrestal Village site, when establishing instrument background levels. Instrument background readings were initially taken at the start of the survey in the far southeast corner of the site, furthest from the impacted Skokie Ditch and Vermont Court areas, and indicated instrument responses of approximately 5,200 cpm. When instrument general area levels dropped from approximately 5,000 cpm to 3,500 - 4,000 cpm, as the survey progressed to the east of Great Lakes Avenue, the use of the far southeast corner of the site as an appropriate area to normalize readings to background values came into question. It was decided to recheck instrument backgrounds to verify operability. During the instrument background recheck, elevated readings in the reference background area were identified and found at levels warranting identification and further investigation and sampling.

A suite of radiological measurement and assessment techniques were employed to detect, measure, quantify, and characterize the isotopic nature of the radiological impacts within the survey area. Survey activities consisted of a systematic gamma radiation walk-over survey, field spectral analysis, surface soil collection, and laboratory spectral analyses.

The soil samples were sent to an off-site contract analytical laboratory for isotopic analyses of the alpha-emitting thorium isotopes and the gamma-emitting isotopes (including radium 226) in the uranium and thorium decay series. The laboratory analyses results for the alpha-emitting thorium isotopes and the 10-day ingrowth period gamma isotopes are included in the report; however, analytical results from the 21-day ingrowth gamma spectroscopy analysis are not yet available. A gamma spectroscopy analyses has been specified for each soil sample submitted. The measurement is made after a 21-day ingrowth period to assure data quality. This 21-day progeny ingrowth period has not yet been achieved at the time of report writing.

This radiological survey report discusses the conduct of the survey and the laboratory results received. Analytical results are summarized in tables provided at the end of the report. Supporting documentation is included in Appendices, as necessary.

2.1 Survey Instrumentation

The gamma radiation walk-over survey was performed using an Eberline E600 hand-held meter and a SPA-3, 2" x 2" Sodium Iodide (NaI) detector. The meter was set to measure gamma radiation in cpm. The Exploranium model GR-130 field-portable, multi-channel, gamma-radiation spectrometer was used to speciate gamma-emitting radionuclides that were present in impacted soils.

2.2 Field Instrument Background Determination

Background for the SPA-3, 2" x 2" NaI detector was established by taking measurements in the far southeast corner of Forrestal Village, southeast of the intersection of East Alabama Avenue and Atlantic Road in a grassy area prior to the start of the walk-over surveys. This area was presumed to be unimpacted and exhibited general area gamma-radiation levels consistent with those areas in and around the Vermont Court area, excluding the previously identified impacted areas. When instrument general area levels dropped from approximately 5,000 cpm to 3,500 - 4,000 cpm, as the survey progressed to the east of Great Lakes Avenue, the use of the far southeast corner of the site as an appropriate area to normalize readings to background values came into question. It was decided to recheck instrument backgrounds to verify operability in this area.

2.3 Volumetric Sample Media Background

Volumetric soil samples were not collected during this survey activity for the determination of background radioactivity concentrations. The Navy has determined the background concentration for thorium 232 for the area to be 0.7 pCi/g.

Analytical data obtained for this survey are compared to published screening level concentrations in determining the relative degree of environmental impact from radionuclides in the surveyed areas.

2.4 Survey and Sample Locations

The walk-over gamma radiation survey encompassed a number of survey areas within the Forrestal Village residential area, as displayed as the diagonal hatch pattern on Figure 1. Soil sampling locations were based solely on elevated gamma walk-over measurements and are shown in Figure 2. Walk-over gamma surveys and volumetric soil sampling were not performed in buildings or in enclosed structures (e.g., homes, garages, sheds, tanks, etc.), on active and busy roadways, or in locked fenced areas (unless the gate was

unlocked by the resident) or in fenced areas where there was a dog (and the owner was not available to remove the dog from the fenced area).

3.0 SURVEY METHODOLOGY

3.1 Walk-Over Gamma Survey

Using the E-600 meter and the SPA-3, 2" x 2" NaI detector held close to the ground surface, the surveyor walked parallel transects across the designated survey area, moving the detector from side-to-side in a serpentine motion (Figure 10). Locations where statistically significant elevated readings (~2 times background) were found were marked by pin-flags for further investigation and located in by a contracted surveyor (Figure 3 through 9). Elevated readings found during the walk-over survey are summarized in Table 2. Table 3 summarizes locations, coordinates, and elevations of the survey points where elevated readings were found.

3.2 Field Portable Gamma Spectral Survey

The Exploranium GR-130 gamma spectrometer was used to acquire spectral measurements, by identifying gamma emitting radionuclides, at select surface soil locations (Figure 11). This measurement provided field assay of isotopic composition of the soil where elevated gamma radiation levels had been encountered during the walk-over survey. It could, for example, identify whether the gamma radiation signal detected was associated with thorium 232 (indicative of Monazite sand) or radium 226 (indicative of naturally occurring radioactive material).

Gamma spectrometer results were recorded in the Project Notebook and logged in the spectrometer's internal memory. Results of the gamma spectrometer measurements are summarized on Table 5.

3.3 Soil Sample Collection

Surface soil samples were collected in areas that exhibited elevated gamma readings (Figure 12). A total of 12 volumetric samples were collected using a standard garden shovel and a small, stainless-steel garden trowel and stainless-steel bowl. Nine of the volumetric soil samples collected were from just under the natural vegetative layer (mostly lawn grass) at a depth of 4 to 12 inches below grade surface (bgs), while the other three samples were collected from material that had the visual appearance of slag, at a depth of 1 to 4 inches bgs (Figure 13). At sample location HS02-04 (in Survey Area 2) and sample location 30 Soil (in Survey Area 26), small fragments of unburned coal were visually identified along with the slag-like material in the soil matrix. Each volumetric sample collected was placed in a plastic sample container with a screw-on cap provided by the contracted analytical laboratory. Each sample container was uniquely identified with the type of media, sample number, date and time sampled, and the individual(s) collecting the sample. Sample information was recorded on a chain-of-custody (CoC) form (Appendix D). Samples were packaged and shipped to Severn Trent Laboratories (STL) for radioanalysis. Sampling equipment was decontaminated with DI water and disposable wipes prior to reuse at the next sample area.

3.4 Static Gamma Measurements

One-minute direct static measurements of the gamma-radiation emission at the soil surface were taken at several locations where elevated readings, greater than ~2 times background levels, were identified. Static measurements were obtained using the E-600 meter and the SPA-3, 2" x 2" NaI detector. The meter was placed in the scaler mode and a one-minute timed count was performed. The 2" x 2" NaI detector was held vertically with the end of the detector placed on the ground surface during the count interval. Results of the static gamma measurement were recorded in a project notebook and are summarized on Table 4.

3.5 Laboratory Analysis

Soil and slag samples were sent to STL, St. Louis, Missouri, for analysis in two separate shipments. The soil and slag samples were analyzed in accordance with approved laboratory procedures using alpha spectroscopy and high-resolution gamma spectroscopy counting systems. Gamma spectroscopy was specified to identify gamma emitting radionuclides from thorium and uranium decay while alpha spectroscopy was specified to identify isotopes of thorium. The analytical methods used by the laboratory were USDOE method A-01-R Mod, which is an Isotopic Alpha Spectroscopy for thorium and USDOE method GA-01-R Mod for the Gamma Spectroscopy analyses. Available laboratory analytical data reports are contained in Appendix A. Results are summarized on Table 6.

4.0 SURVEY RESULTS

The radiological survey results are presented and evaluated in the context of identifying whether there is clear evidence to suggest that radiological impacts to the site are present in the survey areas.

The radiological survey measurements fall into one of three general categories: 1) gross gamma-radiation measurements, 2) field gamma spectroscopy measurements, and 3) laboratory analytical measurements.

Gross gamma radiation measurements (i.e., walk-over gamma scans and static timed gamma measurements) are semi-qualitative. Consequently, these results are used to identify the presence and relative magnitude of radiological impacts to soils within the survey areas. Comparisons of the measured gamma-radiation levels from background areas with those made in impacted areas provide a gross estimate of the magnitude of radiological impacts observed.

Field gamma spectrometer measurements provide insight into the isotopic composition of soils in areas of elevated radioactivity. They provide information that helps identify a likely origin of the radiological contaminant, and in the selection of appropriate isotope-specific screening levels.

The laboratory analytical results specified not only provide confirmation of the isotopic composition, but also render high quality, quantitative measures of the specific radionuclides. These results are suitable not only for comparison with comparable measures of background, but are used in comparing the concentration of radionuclides in soils with soil screening values published by the USNRC or other applicable screening values. The screening values used in this comparison are published in the U.S. Federal Register, Volume 64, No. 234, page 68396, dated December 7, 1999. The screening values are applicable to surface soils and represent surface soil concentrations of individual radionuclides that would be deemed (by the USNRC) in compliance with the 25 mrem/y (0.025 mSv/y) unrestricted release dose limit in 10 CFR 20.1402 (See Appendix B). The surface soil screening values for the isotopes of concern in the Forrestal Village survey areas are presented in Table 1.

4.1 Assessment of the Radiological Impacts to Surface Soils

4.1.1 Walk-Over Gamma Radiation Survey

The designated survey areas were surveyed to detect the potential presence of gamma-radiation emissions elevated with respect to background. Fifty-six discrete locations, within six separate survey areas were identified during the walk-over gamma survey as significantly elevated with respect to the established walk-over background. The elevated survey locations are listed in Table 2 and presented on the site maps in Figures 3 through 9. Figures 3A through 3F show the survey locations in relation to the identifiable

buildings and streets. The spatial coordinates of the elevated survey locations are listed in Table 3.

Locations where elevated readings were encountered exhibited radiological properties that suggest they do not derive from natural (or passive) environmental transport mechanisms. This supports the continued assumption that elevated readings are derived from discretely deposited materials (likely fill materials) in these areas.

Ten areas with elevated gamma-radiation readings were identified in Survey Area 1, in and among the existing housing structures located west of Vermont Court. One area with elevated gamma radiation readings was identified in the backyard between houses numbered 4232 and 4233, off of Vermont Avenue in Survey Area 3. Twenty-two areas with elevated gamma radiation readings were identified in Survey Area 2, 15 parallel to and north of the first base line of the ball field and 7 grouped to the west of the right-field area outside the outfield fence boundary. Ten areas with elevated gamma-radiation readings were identified along Great Lakes Drive (one inside Survey Area 15 and 9 on the west side of Great Lakes Drive) at the bus stop north of Oregon Court. Twelve areas with elevated gamma radiation readings were identified in Survey Area 26, in the far southeast corner of the site along the Forrestal Village boundary fence line. One area was identified with slightly elevated gamma-radiation readings in Survey Area 17, north of Wyoming Court in the backyard area.

4.1.2 Static Gamma Measurements of Elevated Surface Soil Locations

Static one-minute count results from each of the selected elevated surface soil locations are presented in Table 4. Review of the results indicates that static one-minute measurements are notably higher than the established background level (2.0 to 9.4 times). This suggests that there are radiological impacts to the surface soils in the survey areas. Comparison of the walk-over scan results with the static one-minute count results show high correlation between the data sets.

4.1.3 Field Isotopic Analysis of Elevated Surface Soil Locations

The Exploranium, GR-130, field-portable, gamma spectrometer was used to assess the isotopic composition of soils where elevated gamma radiation was detected. In 15 locations where the Exploranium was employed to identify the isotopic composition of the elevated soil, 5 locations were assayed and found to exhibit a gamma signature consistent with that of isotopes from the thorium 232 decay series (Table 5). None of the locations assayed exhibited a gamma signature consistent with radium 226 and its progeny. This in-field analysis suggests that the impacts to surface soils, especially at those areas where thorium 232 was identified, are likely derived from contaminants originating from the Monazite sand area.

4.1.4 Isotopic Analysis of Surface Soil Samples

Volumetric soil and slag samples were collected from locations where walk-over gamma surveys identified areas with significantly elevated readings with respect to background count rate values. The locations of the soil samples are shown in Figure 2, 3 and 3A

through 3F and are listed in Table 6. These samples were collected in order to quantitatively assess the potential radiological impacts to the soils in the survey areas and to corroborate the field determination of its isotopic composition. The samples were analyzed by STL, a contract laboratory specializing in radiolytic measurements.

To date, all isotopic thorium analysis results for soil samples have been received from the laboratory and are considered final results. Gamma spectroscopy analysis results for the first seven soil samples have been received from the laboratory and are considered final results. These seven samples were analyzed after the requested 21-day ingrowth period. Gamma spectroscopy analysis results for two soil samples, submitted after the first group, have been received from the laboratory and are considered draft results only (results are after a 10-day ingrowth period). Gamma spectroscopy results for three slag-like material samples have not been received from the laboratory.

One soil sample result was at the USNRC screening level value for thorium 232. Six soil sample results exceeded the screening level for thorium 232 by from 4 to more than seventy times. Five soil sample results of the radium 226 isotope and applicable progeny isotopes exceeded the USNRC soil screening levels for radium 226+C. In one instance (HS02-04), the radium 226 activity (9.6 pCi/g gross) by gamma spectroscopy was reported at 14.2 times the screening level value.

Volumetric soil samples were not taken for background determination during this sampling activity. Applicable background measurement values, for isotopic thorium and radium, were obtained and identified in the *Interim Radiological Assessment Survey Report* and are listed in Table 7.

Laboratory results by alpha spectroscopy and 10-day ingrowth gamma spectroscopy for soil samples have been received and reviewed. Gamma spectroscopy laboratory results are consistent with the isotopic thorium analysis performed by the laboratory and show a high degree of correlation between the different analytical methods.

Analysis of the results suggests that thorium 228 and thorium 232 concentrations, in six independent locations, are significantly higher than the concentrations known to exist as background in unimpacted soils. This result is consistent with static gamma measurements and gamma walk-over measurements described above, and again suggests that there are distinguishable and potentially significant radiological impacts to the soils in discrete locations around the site.

5.0 CONCLUSION

MACTEC conducted a walk-over gamma radiation survey of the ground surface at the Forrestal Village site to determine whether previously unidentified radiation anomalies might be present. This survey was undertaken because radiation anomalies, potentially associated with formerly licensed activities at a nearby site, were previously discovered on the Forrestal Village property. The gamma walk-over survey was organized into phases that covered a predetermined portion of the Forrestal Village site. Each phase was further subdivided into survey areas to manage and facilitate the organized implementation of the survey.

The survey that was performed included only those areas identified in Figure 1. Remaining land areas at the Forrestal Village site were not surveyed for radiological impacts. Surveys and sampling performed at the site include only those soils that were surface and near-surface soils (no greater than 6 inches bgs for surveys with hand-held instruments and no greater than 12 inches for volumetric soil samples). Survey data was not collected for deeper soils at the Forrestal Village site.

Fifty-six locations with elevated surface gamma radiation readings were identified within the areas surveyed. These fifty-six anomalies were distributed within six different survey areas. Locations with elevated surface gamma radiation levels detected in the survey ranged from 2 to 8.6 times the measured background surface gamma radiation levels encountered at the site.

Sampling was performed at nine of the fifty-six locations with elevated surface radiation readings. Nine volumetric soil samples and three slag samples (associated with soil samples from the same location) were collected and analyzed. The soil samples were found to contain elevated quantities of thorium 232 activity, as high as approximately 80 pCi/g by high-resolution gamma spectroscopy.

Survey and analytical laboratory results provide supportive evidence that the identified radiological impacts (at all but one of the nine locations sampled) are from a source that is enriched in thorium but not in radium. Soil samples collected from areas where elevated gamma readings were obtained confirm that concentrations of thorium 232 are 5 to 70 times the USNRC's published surface soil screening values presented in Section 4.0 of this report. In all but one sample location, the contaminant's radiological composition is consistent with that of radionuclides found in Monazite sands.

In the single sample that was not thorium rich (not characteristic of Monazite sands) radium 226 was elevated to more than 16 times the USNRC's published surface soil screening value. This sample showed relatively low concentrations of thorium 228 and thorium 232, as compared to the radium 226 activity. This composition of isotopes and their activities is more characteristic of fly ash than of Monazite sands (*Radioactive Elements in Coal and Fly Ash: Abundance, Forms, and Environmental Significance*; U.S. Geological Survey Fact Sheet FS-163-97, October 1997) and may shed some light on the possible source term for the contaminant at this location.

Given that elevated concentrations of radioactivity rich in thorium 232 (in the absence of comparably elevated concentrations of radium 226) were found in the northwest corner of the Forrestal Village site boundary (Survey Area 1) and in the southeast corner of the Forrestal Village site boundary (Survey Area 26), the possibility that the radioactivity encountered could be associated with the stockpiling (and other operations) of Monazite sand cannot be ruled out. It is apparent, from the deposition patterns observed in the field, that the soils exhibiting elevated concentrations of radioactivity are not native to the site and were likely placed as fill at an earlier, unknown date. Therefore, MACTEC concludes that the afore-mentioned areas (surface and near-surface soils) identified at the subject property are radiologically impacted with elevated concentrations of radioactive material.

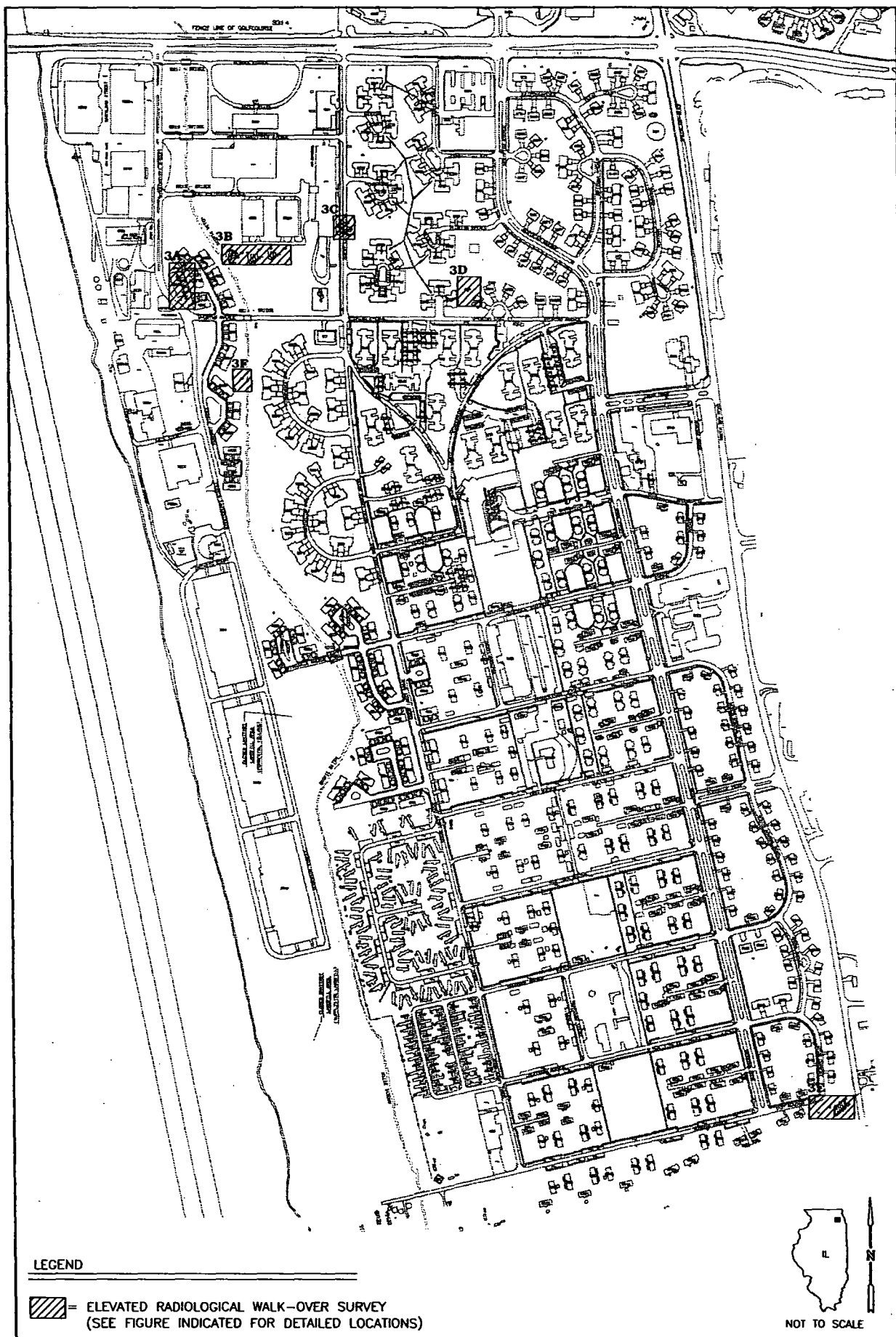
FIGURES



Figure 1 Forrestral Village Survey Areas and Phases



Figure 2 Volumetric Sample Locations



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GAP

PROJECT NUMBER
3205050441.01

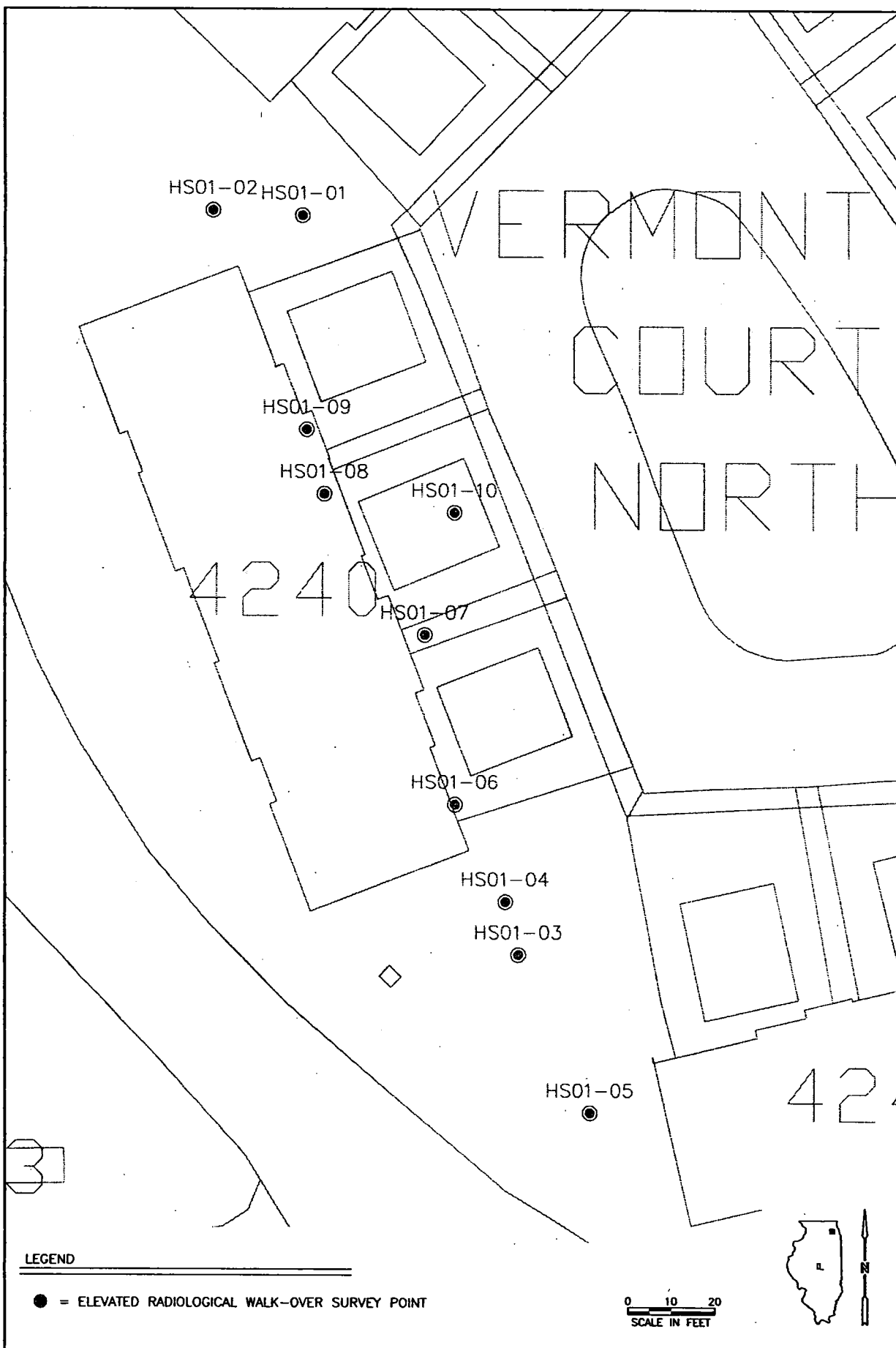
APPROVED
DEN

DATE
12/08/05

REVISED DATE

ELEVATED RADIOLOGICAL WALK-OVER
SURVEY LOCATIONS
Navy Property at Forrestal Village
Great Lakes, IL

FIGURE
3



MACTEC
Engineering and Consulting, Inc.

ELEVATED RADIOLOGICAL WALK-OVER
SURVEY LOCATIONS
Navy Property at Forrestal Village
Great Lakes, IL

FIGURE

3A

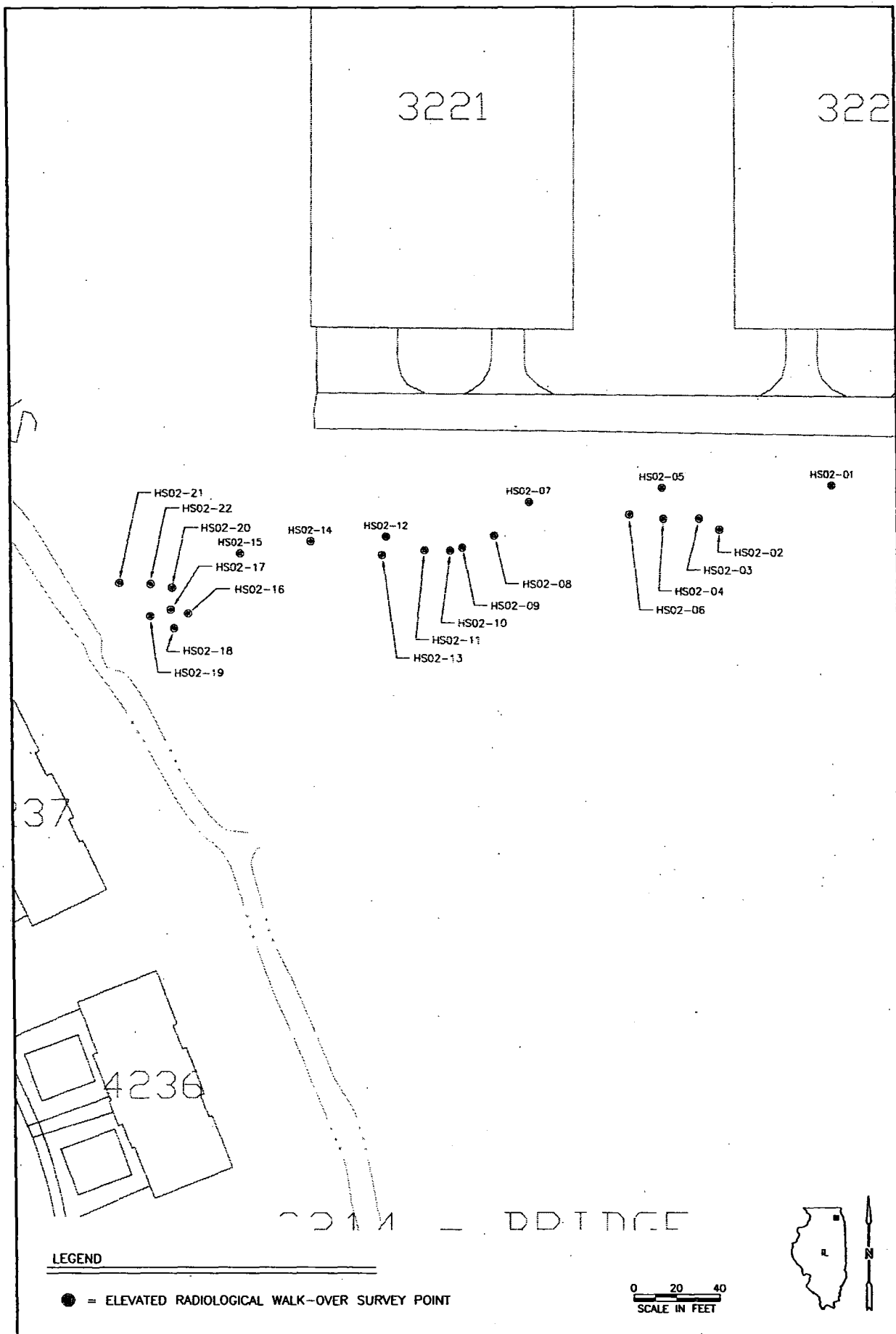
DRAWN
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PROJECT NUMBER
3205050441.01

APPROVED
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DATE
12/08/05

REVISED DATE



MACTEC
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DRAWN
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3205050441.01

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DEN

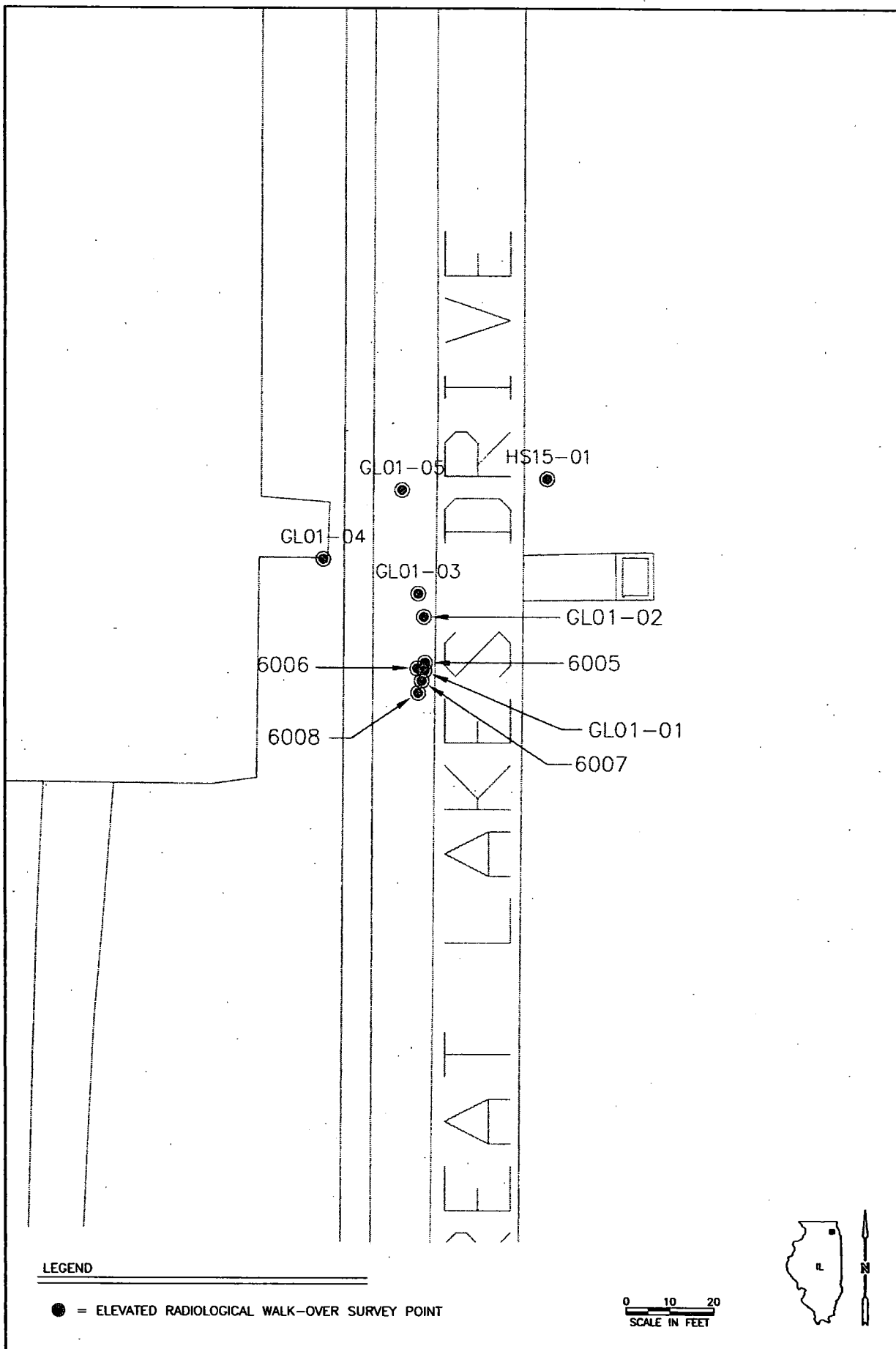
DATE
12/08/05

REVISED DATE

ELEVATED RADIOLOGICAL WALK-OVER
SURVEY LOCATIONS
Navy Property at Forrestal Village
Great Lakes, IL

FIGURE

3B



MACTEC
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ELEVATED RADIOLOGICAL WALK-OVER
SURVEY LOCATIONS
Navy Property at Forrestal Village
Great Lakes, IL

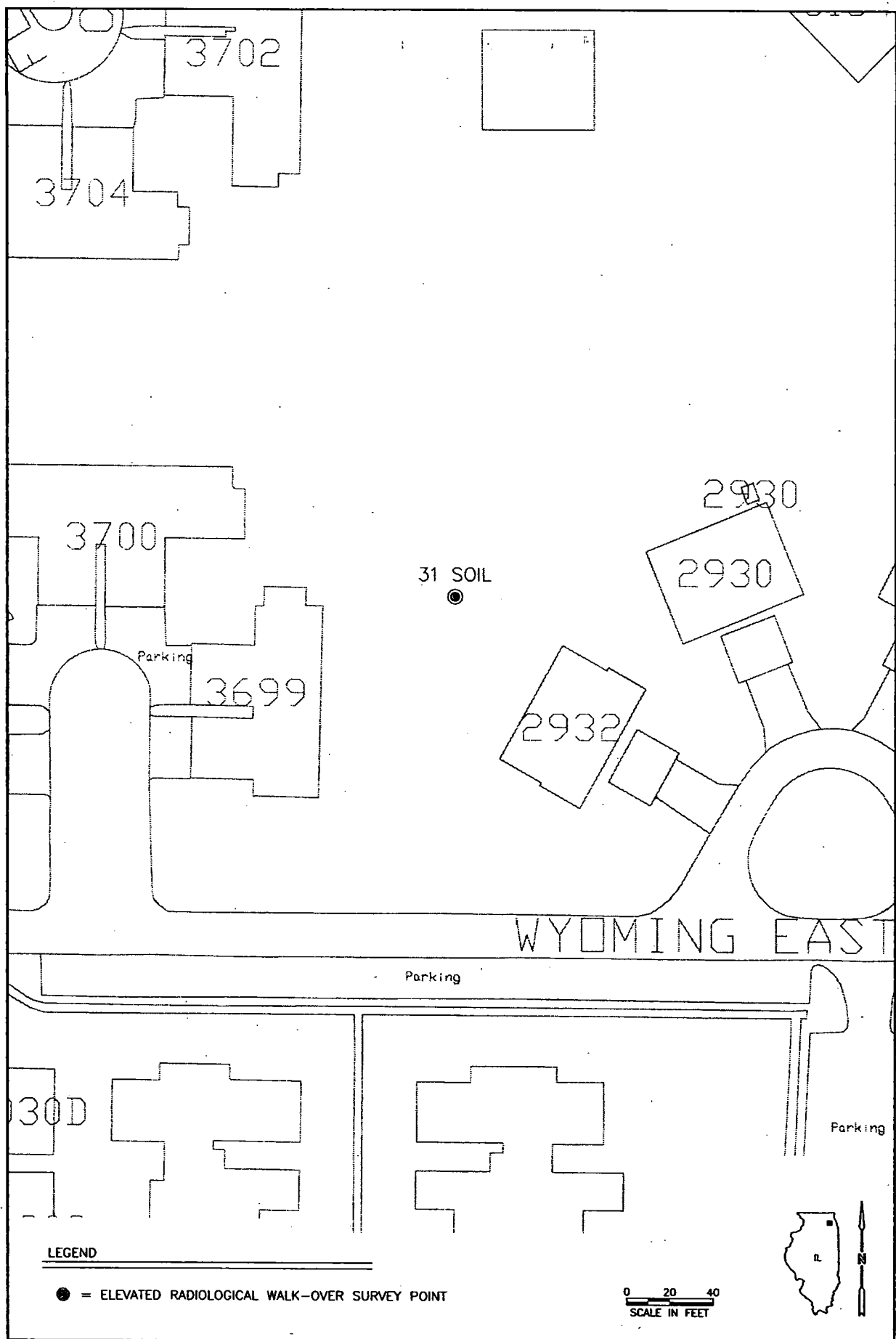
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DATE
12/08/05

REVISED DATE



MACTEC
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PROJECT NUMBER
3205050441.01

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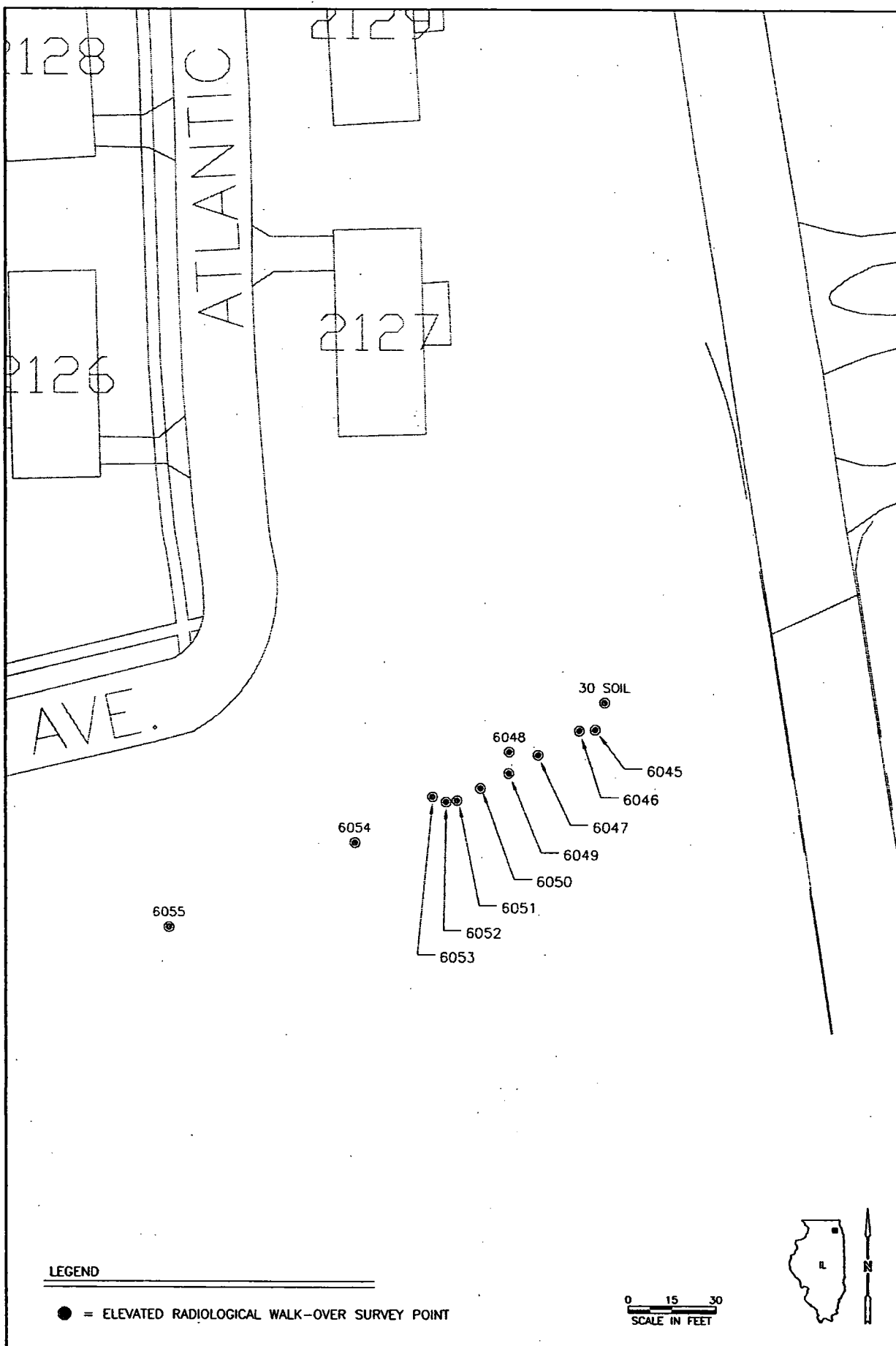
DATE
12/08/05

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ELEVATED RADIOLOGICAL WALK-OVER
SURVEY LOCATIONS
Navy Property at Forrestal Village
Great Lakes, IL

FIGURE

3D



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Engineering and Consulting, Inc.

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3205050441.01

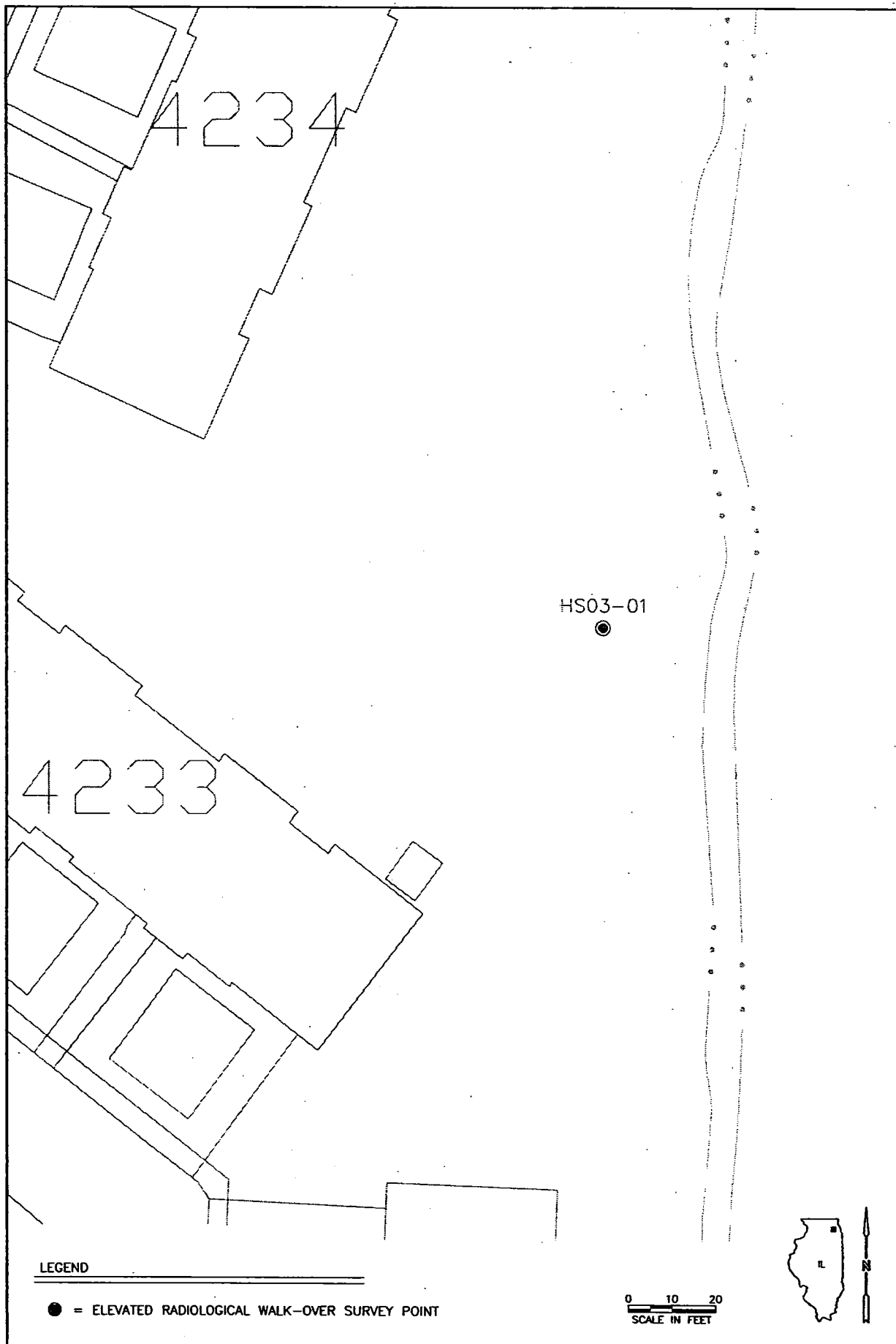
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DEN

DATE
12/08/05

REVISED DATE

ELEVATED RADIOLOGICAL WALK-OVER
SURVEY LOCATIONS
Navy Property at Forrestal Village
Great Lakes, IL

FIGURE
3E



MACTEC
Engineering and Consulting, Inc.

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PROJECT NUMBER
3205050441.01

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DATE
12/08/05

FIGURE
3F
REVISED DATE

ELEVATED RADIOLOGICAL WALK-OVER
SURVEY LOCATIONS
Navy Property at Forrestal Village
Great Lakes, IL



Figure 10 Walk-Over Gamma Survey

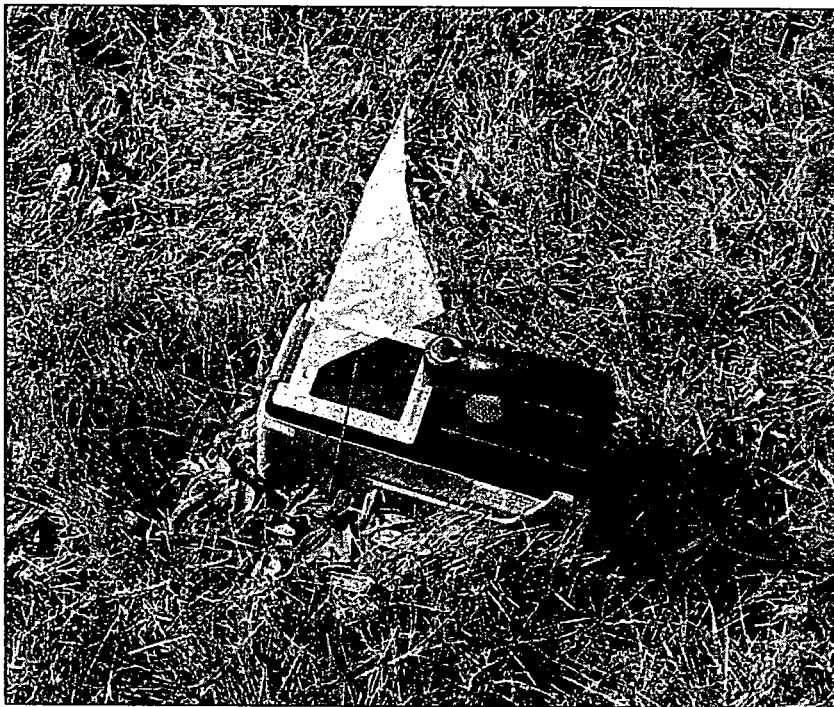


Figure 11 Exploranium GR-130 Gamma Spectrometer



Figure 12 Collecting Soil Volumetric Sample

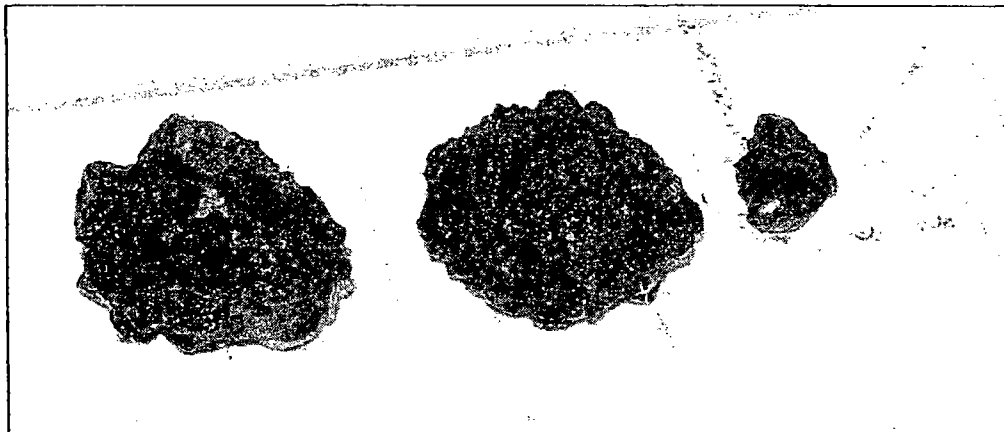


Figure 13 Slag-Like Slag Samples

TABLES

Table 1 NRC Surface Screening Values

Isotope	Concentration (pCi/g)
radium 226+C (plus progeny)	0.6
thorium 228+C	4.7
Th-230	1.8
thorium 232+C	1.1

Table 2 Elevated Gamma Walk-Over Survey Measurements (Soil)

Location ID	Sample ID	Survey Area	Location Description	Scan Value (kcpm) ¹
6001	GL01-04	na	Great Lakes Rd.	8.5
6002	GL01-05	na	Great Lakes Rd.	12.5
6003	GL01-03	na	Great Lakes Rd.	10
6004	GL01-02	na	Great Lakes Rd.	12
6005	GL01-02	na	Great Lakes Rd.	12
6006	na	na	Great Lakes Rd.	9.8
6007	na	na	Great Lakes Rd.	10
6008	na	na	Great Lakes Rd.	11
6009	GL01-01	na	Great Lakes Rd.	15.4
6010	HS15-01	15	Great Lakes Rd.	9.9
6011	HS02-16	02	Ball Field	9.3
6012	HS02-18	02	Ball Field	25
6013	HS02-17	02	Ball Field	12
6014	HS02-19	02	Ball Field	10
6015	HS02-20	02	Ball Field	10
6016	HS02-22	02	Ball Field	10
6017	HS02-21	02	Ball Field	10
6018	HS02-15	02	Ball Field	9
6019	HS02-14	02	Ball Field	10
6020	HS02-13	02	Ball Field	11
6021	HS02-12	02	Ball Field	10
6022	HS02-11	02	Ball Field	10
6023	HS02-10	02	Ball Field	9
6024	HS02-09	02	Ball Field	10
6025	HS02-08	02	Ball Field	11
6026	HS02-07	02	Ball Field	10
6027	HS02-06	02	Ball Field	10
6028	HS02-04	02	Ball Field	13
6029	HS02-05	02	Ball Field	10
6030	HS02-03	02	Ball Field	10
6031	HS02-02	02	Ball Field	10
6032	HS02-01	02	Ball Field	9
6035	HS01-10	01	Vermont Ct.	23
6036	HS01-01	01	Vermont Ct.	17
6037	HS01-02	01	Vermont Ct.	10
6038	HS01-04	01	Vermont Ct.	19.8
6039	HS01-03	01	Vermont Ct.	43
6040	HS01-05	01	Vermont Ct.	15
6043	HS03-01	03	Vermont Ave.	15

Location ID	Sample ID	Survey Area	Location Description	Scan Value (kcpm) ¹
6044	30 Soil	26	SE Corner	11
6045	na	26	SE Corner	10
6046	na	26	SE Corner	9
6047	na	26	SE Corner	10
6048	na	26	SE Corner	12
6049	na	26	SE Corner	9
6050	na	26	SE Corner	9.5
6051	na	26	SE Corner	11
6052	na	26	SE Corner	9
6053	na	26	SE Corner	10.5
6054	na	26	SE Corner	10
6055	na	26	SE Corner	10
6056	31 Soil	17	Wyoming Ct.	10
6060	HS01-09	01	Vermont Ct.	16
6061	HS01-08	01	Vermont Ct.	19
6062	HS01-06	01	Vermont Ct.	17
not identified	HS01-07	01	Vermont Ct.	13

1 Measurements taken with the 2" x 2" NaI detector.

Table 3 Elevated Survey Measurement Coordinate Locations

Location	Northing	Easting	Elevation
6001	2054405.897000	1109749.743000	686.420
6002	2054421.560000	1109767.911000	686.075
6003	2054398.200000	1109771.464000	686.043
6004	2054392.954000	1109772.785000	685.959
6005	2054382.649000	1109773.057000	685.960
6006	2054381.378000	1109771.261000	685.997
6007	2054378.624000	1109772.286000	685.969
6008	2054375.818000	1109771.408000	686.072
6009	2054381.006000	1109772.836000	685.961
6010	2054423.959000	1109800.990000	686.204
6011	2054227.322000	1109150.924000	676.785
6012	2054220.833000	1109144.375000	676.693
6013	2054229.120000	1109142.977000	676.871
6014	2054226.239000	1109133.557000	676.863
6015	2054239.238000	1109143.600000	677.056
6016	2054240.851000	1109133.758000	677.780
6017	2054241.407000	1109119.659000	678.086
6018	2054254.715000	1109174.794000	678.377
6019	2054260.112000	1109207.228000	679.261
6020	2054253.976000	1109240.053000	677.921
6021	2054262.295000	1109242.298000	679.255
6022	2054256.060000	1109259.751000	678.795
6023	2054256.176000	1109271.546000	678.182
6024	2054257.306000	1109277.191000	678.932
6025	2054262.858000	1109292.216000	679.677
6026	2054277.970000	1109308.223000	680.404
6027	2054272.149000	1109354.682000	680.891
6028	2054269.972000	1109370.514000	680.960
6029	2054284.252000	1109369.911000	681.712
6030	2054270.328000	1109386.994000	681.208
6031	2054265.412000	1109396.428000	680.578
6032	2054285.300000	1109448.307000	682.422
6035	2054107.870000	1108882.861000	681.402
6036	2054174.702000	1108848.124000	681.461

Location	Northing	Easting	Elevation
6037	2054175.898000	1108828.208000	681.789
6038	2054020.043000	1108894.622000	681.381
6039	2054008.340000	1108897.711000	681.485
6040	2053972.824000	1108913.945000	681.557
6043	2053570.150000	1109204.027000	675.961
6044	2049602.265000	1112544.067000	710.243
6045	2049595.758000	1112542.488000	709.628
6046	2049595.388000	1112537.118000	709.435
6047	2049587.130000	1112522.981000	708.179
6048	2049588.255000	1112513.167000	707.906
6049	2049580.829000	1112513.065000	707.348
6050	2049575.824000	1112503.351000	706.565
6051	2049571.663000	1112495.267000	706.056
6052	2049571.212000	1112491.500000	705.799
6053	2049573.010000	1112486.897000	705.768
6054	2049557.161000	1112459.952000	704.609
6055	2049528.165000	1112396.107000	703.735
6056	2054055.560000	1110470.313000	697.507
6060	2054126.416380	1108849.240989	0.000
6061	2054111.841573	1108853.464140	0.000
6062	2054042.106528	1108883.017725	0.000

Datum (coordinate system) used is NAD 83 State Plane Illinois East

Table 4 Static Gamma Survey Measurement Results (Soil)

Location ID	Sample ID	Survey Area	Location Description	Static Measurement Value (kcpm) ¹
6039	HS01-03	01	Vermont Ct.	47
6035	HS01-10	01	Vermont Ct.	22.4
6038	HS01-04	01	Vermont Ct.	18.9
6061	HS01-08	01	Vermont Ct.	18.9
6062	HS01-06	01	Vermont Ct.	17.2
6036	HS01-01	01	Vermont Ct.	16.6
6060	HS01-09	01	Vermont Ct.	16.2
6043	HS03-01	03	Vermont Ave.	15.5
6040	HS01-05	01	Vermont Ct.	14.7
6009	GL01-01	na	Great Lakes Rd.	14
not identified	HS01-07	01	Vermont Ct.	11.9
6010	HS15-01	15	Great Lakes Rd.	10.1
6037	HS01-02	01	Vermont Ct.	9.4

¹ Measurements were taken with the 2"x 2" NaI detector.

Table 5 Exploranium GR-130 Survey Results

Survey Location	Location Description	Gamma Spec ID
GL01-02	Great Lakes Rd.	Th-232
HS02-18	Ball Field	Th-232
HS01-01	Vermont Ct.	Th-232
HS03-01	Vermont Ave.	Th-232
30 Soil	SE Corner	Th-232
HS01-10	Vermont Ct.	NI
HS01-02	Vermont Ct.	NI
HS01-04	Vermont Ct.	NI
HS01-05	Vermont Ct.	NI
HS01-09	Vermont Ct.	NI
HS01-08	Vermont Ct.	NI
HS01-06	Vermont Ct.	NI
HS01-07	Vermont Ct.	NI
HS01-03	Vermont Ct.	NI
31 Soil	Wyoming Ct.	NI
GL01-01	Great Lakes Rd.	NI
HS15-01	Great Lakes Rd.	NI
HS02-04	Ball Field	NI

Table 6 Thorium and Radium Analyses Results (Soil and Slag)

Sample ID	Location ID	Thorium 228 (α)	Thorium 230 (α)	Thorium 232 (α)	Thorium 232 (γ)	Radium 226 (γ)
HS01-01	6036	38.7	5.11	38.4	28.2	3.63
R01-01	6036	na	na	na	na	na
HS01-03	6039	44.4	7.1	43.3	81.1	8.7
HS02-04	6028	1.57	8.9	1.8	2.19	9.6
R02-04	6028	na	na	na	na	na
HS02-18	6012	40	6.8	39.1	27.9	4.88
HS03-01	6043	9.1	2.39	9.1	9.7	1.47
HS15-01	6010	8.9	2.22	8.8	5.9	1.53
GL01-01	6009	18.9	3.5	19.3	18.4	2.98
30 Soil	6044	1.64	2.55	1.72	3.26*	3.38*
30 Rock	6044	na	na	na	na	na
31 Soil	6056	0.77	1.34	0.75	0.53*	0.92*

(γ) Analysis by gamma spectroscopy, results in pCi/g, gross.

(α) Analysis by alpha spectroscopy, results in pCi/g, gross.

* Draft 10-day ingrowth sample results by gamma spectroscopy, gross.

Table 7 Volumetric Soil Sample Activity Background Values

By Alpha Spectroscopy		By Gamma Spectroscopy	
thorium 228	1.04 pCi/g	thorium 232	0.70 pCi/g
thorium 230	1.42 pCi/g	radium 226	1.10 pCi/g
thorium 232	0.88 pCi/g		

APPENDIX A

**Severn Trent Laboratories, Inc.
Laboratory Analytical Results**

**SEVERN
TRENT**

STL

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Tel: 314 298 8566 Fax: 314 298 8757
www.stl-inc.com

ANALYTICAL REPORT

Forrestal Village

Lot #: F5K160344

Jeff Lively

Mactec Engineering & Consultin
751 Horizon Court
Suite 104
Grand Junction, CO 81506

SEVERN TRENT LABORATORIES, INC.



David Rekosh
Project Manager

November 21, 2005

Case Narrative
LOT NUMBER: F5K160344

This report contains the analytical results for the nine samples received under chain of custody by STL St. Louis on November 16, 2005. These samples are associated with your Forrestal Village project.

The analytical results included in this report meet all applicable quality control procedure requirements.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

There were no observations or nonconformances associated with the analysis of these samples.

METHODS SUMMARY

F5K160344

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Isotopic Thorium by Alpha Spectroscopy	EML A-01-R MOD	

References:

EML "ENVIRONMENTAL MEASUREMENTS LABORATORY PROCEDURES MANUAL"
HASL-300 28TH EDITION, VOLUME I and II DEPARTMENT OF ENERGY

SAMPLE SUMMARY

F5K160344

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
HQCMW	001	HS01-01	11/12/05	08:15
HQCNA	002	HS01-03	11/12/05	08:40
HQCNH	004	HS02-04	11/12/05	10:12
HQCNQ	006	HS03-01	11/12/05	11:45
HQCNV	007	HS02-18	11/12/05	09:48
HQCNX	008	GL01-01	11/13/05	15:30
HQCN0	009	HS15-01	11/13/05	16:03

NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS01-01

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-001

Work Order: HOCMW

Matrix: SOLID

Date Collected: 11/12/05 0815

Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		A-01-R MOD		
Thorium 228	38.7		5.3	0.08	11/18/05	11/20/05	5322525	69
Thorium 230	5.11		0.85	0.06	11/18/05	11/20/05	5322525	69
Thorium 232	38.4		5.3	0.06	11/18/05	11/20/05	5322525	69

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

MACTEC Engineering and Consulting Inc

Client Sample ID: HS01-01 DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-001X

Date Collected: 11/12/05 0815

Work Order: HOCMW

Date Received: 11/16/05 0900

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		A-01-R MOD		
Thorium 228	40.2		5.2	0.07	11/18/05	11/20/05	5322525	85
Thorium 230	5.62		0.86	0.04	11/18/05	11/20/05	5322525	85
Thorium 232	40.3		5.2	0.04	11/18/05	11/20/05	5322525	85

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

MACTEC Engineering and Consulting Inc

Client Sample ID: HS01-03

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-002
Work Order: HOCNA
Matrix: SOLID

Date Collected: 11/12/05 0840
Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		A-01-R MOD		
Thorium 228	44.4		6.0	0.08	11/18/05	11/20/05	5322525	82
Thorium 230	7.1		1.1	0.05	11/18/05	11/20/05	5322525	82
Thorium 232	43.3		5.8	0.03	11/18/05	11/20/05	5322525	82

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

MACTEC Engineering and Consulting Inc

Client Sample ID: HS02-04

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-004

Date Collected: 11/12/05 1012

Work Order: HOCNH

Date Received: 11/16/05 0900

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g	A-01-R MOD			
Thorium 228	1.57		0.34	0.08	11/18/05	11/20/05	5322525	74
Thorium 230	8.9		1.3	0.05	11/18/05	11/20/05	5322525	74
Thorium 232	1.80		0.37	0.05	11/18/05	11/20/05	5322525	74

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

MACTEC Engineering and Consulting Inc

Client Sample ID: HS03-01

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-006
Work Order: HOCNO
Matrix: SOLID

Date Collected: 11/12/05 1145
Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		A-01-R MOD		
Thorium 228	9.1		1.2	0.08	11/18/05	11/20/05	5322525	88
Thorium 230	2.39		0.42	0.04	11/18/05	11/20/05	5322525	88
Thorium 232	9.1		1.2	0.03	11/18/05	11/20/05	5322525	88

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS02-18

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-007

Date Collected: 11/12/05 0948

Work Order: HOCNV

Date Received: 11/16/05 0900

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		A-01-R MOD		
Thorium 228	40.0		5.2	0.07	11/18/05	11/20/05	5322525	86
Thorium 230	6.8		1.0	0.05	11/18/05	11/20/05	5322525	86
Thorium 232	39.1		5.1	0.05	11/18/05	11/20/05	5322525	86

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

MACTEC Engineering and Consulting Inc

Client Sample ID: GL01-01

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-008
Work Order: HOCNX
Matrix: SOLID

Date Collected: 11/13/05 1530
Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g	A-01-R MOD			
Thorium 228	18.9		2.5	0.09	11/18/05	11/20/05	5322525	74
Thorium 230	3.50		0.60	0.03	11/18/05	11/20/05	5322525	74
Thorium 232	19.3		2.6	0.05	11/18/05	11/20/05	5322525	74

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

MACTEC Engineering and Consulting Inc

Client Sample ID: HS15-01

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160344-009

Date Collected: 11/13/05 1603

Work Order: HOCN0

Date Received: 11/16/05 0900

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g	A-01-R MOD			
Thorium 228	8.9		1.2	0.07	11/18/05	11/20/05	5322525	83
Thorium 230	2.22		0.41	0.05	11/18/05	11/20/05	5322525	83
Thorium 232	8.8		1.2	0.05	11/18/05	11/20/05	5322525	83

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

METHOD BLANK REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K160344
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Lab Sample ID			
					Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD			pCi/g	A-01-R MOD	F5K180000-525B			
Thorium 228	0.012	U	0.031	0.055	11/18/05	11/20/05	5322525	97
Thorium 230	0.095	J	0.066	0.059	11/18/05	11/20/05	5322525	97
Thorium 232	-0.002	U	0.021	0.040	11/18/05	11/20/05	5322525	97

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K160344

Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert. (2 σ +/-)	MDC	% Yld	% Rec	Lab Sample ID QC Control Limits
Iso THORIUM (LONG CT) DOE A-01-R MOD			pCi/g	A-01-R MOD			F5K180000-525C
Thorium 228	0.0	1.09	0.62	0.50	97	****	(91 - 132)
Thorium 230	58.5	57.6	7.4	0.3	97	98	(62 - 141)
Thorium 232	0.0	0.77	0.49	0.19	97	****	(88 - 133)
Batch #:		5322525	Analysis Date: 11/20/05				

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

DUPLICATE EVALUATION REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K160344
Matrix: SOLID

Date Sampled: 11/12/05
Date Received: 11/16/05

Parameter	SAMPLE Result	Total Uncert. (2σ +/-)	% Yld	DUPLICATE Result	Total Uncert. (2 σ +/-)	% Yld	QC Sample ID Precision
Iso THORIUM (LONG CT) DOE A-01-R MOD			pCi/g	A-01-R MOD			F5K160344-001
Thorium 228	38.7	5.3	69	40.2	5.2	85	4 %RPD
Thorium 230	5.11	0.85	69	5.62	0.86	85	10 %RPD
Thorium 232	38.4	5.3	69	40.3	5.2	85	5 %RPD
Batch #:		5322525 (Sample)		5322525 (Duplicate)			

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off error in calculated results

SEVERN
TRENT

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13715 Rider Trail North
Earth City, MO 63045

Tel: 314 298 8566 Fax: 314 298 8757
www.stl-inc.com

ANALYTICAL REPORT

Forrestal Village

Lot #: F5K210216

Jeff Lively

Mactec Engineering & Consultin
751 Horizon Court
Suite 104
Grand Junction, CO 81506

SEVERN TRENT LABORATORIES, INC.



David Rekosh
Project Manager

December 7, 2005

Leaders in Environmental Testing

Severn Trent Laboratories, Inc.

Case Narrative
LOT NUMBER: F5K210216

This report contains the analytical results for the three samples received under chain of custody by STL St. Louis on November 21, 2005. These samples are associated with your Forrestal Village project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Gamma Spectroscopy by GA-01-R Mod

Ra-226 is reported in these samples at the client's request. Ra-226 is reported from the 609.31 keV line of Bi-214. Because the samples have not had a 21 day ingrowth the activity for Ra-226 is an estimated value and may be biased low. This bias is caused by the disruption of secular equilibrium between Ra-226 and Bi-214 by the loss of Rn-222 during sample preparation.

Affected Samples:

F5K210216 (1): #30 SOIL

F5K210216 (3): #31 SOIL

METHODS SUMMARY

F5K210216

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Gamma Spectroscopy - Radium-226 & Hits	EML GA-01-R MOD	
Isotopic Thorium by Alpha Spectroscopy	EML A-01-R MOD	

References:

EML "ENVIRONMENTAL MEASUREMENTS LABORATORY PROCEDURES MANUAL"
HASL-300 28TH EDITION, VOLUME I and II DEPARTMENT OF ENERGY

SAMPLE SUMMARY

F5K210216

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
HQN8G	001	#30 SOIL	11/15/05	15:31
HQN8J	003	#31 SOIL	11/15/05	16:40

NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

MACTEC Engineering and Consulting Inc

Client Sample ID: #30 SOIL

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K210216-001

Date Collected: 11/15/05 1531

Work Order: HQN8G

Date Received: 11/21/05 0915

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	3.3		1.2	0.6	11/23/05	12/03/05	5327169	
Bismuth 212	2.0	U	1.1	2.4	11/23/05	12/03/05	5327169	
Bismuth 214	3.38		0.70	0.35	11/23/05	12/03/05	5327169	
Lead 210	4.7	U	3.2	6.2	11/23/05	12/03/05	5327169	
Lead 212	3.18		0.51	0.24	11/23/05	12/03/05	5327169	
Lead 214	3.53		0.66	0.34	11/23/05	12/03/05	5327169	
Potassium 40	22.6		4.7	1.7	11/23/05	12/03/05	5327169	
Radium (226)	3.38		0.70	0.35	11/23/05	12/03/05	5327169	
Radium 228	3.26		0.98	0.63	11/23/05	12/03/05	5327169	
Radium 224	11.0		6.5	5.2	11/23/05	12/03/05	5327169	
Thallium 208	0.89		0.24	0.21	11/23/05	12/03/05	5327169	
Thorium 232	3.26		0.98	0.63	11/23/05	12/03/05	5327169	
Thorium 234	3.7	U	3.2	4.0	11/23/05	12/03/05	5327169	
Uranium 238	3.7	U	3.1	4.0	11/23/05	12/03/05	5327169	
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g	A-01-R MOD			
Thorium 228	1.64		0.36	0.08	11/23/05	11/28/05	5327105	73
Thorium 230	2.55		0.49	0.06	11/23/05	11/28/05	5327105	73
Thorium 232	1.72		0.37	0.06	11/23/05	11/28/05	5327105	73

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: #30 SOIL DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K210216-001X

Work Order: HQN8G

Matrix: SOLID

Date Collected: 11/15/05 1531

Date Received: 11/21/05 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g	A-01-R MOD			
Thorium 228	2.14		0.43	0.07	11/23/05	11/28/05	5327105	73
Thorium 230	3.14		0.56	0.08	11/23/05	11/28/05	5327105	73
Thorium 232	1.90		0.39	0.05	11/23/05	11/28/05	5327105	73
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	2.04		0.81	0.65	11/23/05	12/05/05	5327169	
Bismuth 212	1.23	U	0.99	2.0	11/23/05	12/05/05	5327169	
Bismuth 214	3.19		0.64	0.33	11/23/05	12/05/05	5327169	
Lead 210	1.9	U	2.4	4.6	11/23/05	12/05/05	5327169	
Lead 212	2.51		0.41	0.23	11/23/05	12/05/05	5327169	
Lead 214	3.83		0.65	0.30	11/23/05	12/05/05	5327169	
Potassium 40	17.2		3.6	1.9	11/23/05	12/05/05	5327169	
Radium (226)	3.19		0.64	0.33	11/23/05	12/05/05	5327169	
Radium 228	2.04		0.69	0.65	11/23/05	12/05/05	5327169	
Radium 224	6.4		3.8	2.5	11/23/05	12/05/05	5327169	
Thallium 208	0.83		0.21	0.17	11/23/05	12/05/05	5327169	
Thorium 232	2.04		0.69	0.65	11/23/05	12/05/05	5327169	
Thorium 234	3.5	U	2.1	3.9	11/23/05	12/05/05	5327169	
Uranium 238	3.5	U	2.1	3.9	11/23/05	12/05/05	5327169	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: #31 SOIL

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K210216-003

Date Collected: 11/15/05 1640

Work Order: HQN8J

Date Received: 11/21/05 0915

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	0.53		0.35	0.42	11/23/05	12/03/05	5327169	
Bismuth 212	0.32	U	0.51	1.0	11/23/05	12/03/05	5327169	
Bismuth 214	0.92	U	0.61	1.2	11/23/05	12/03/05	5327169	
Lead 210	0.5	U	1.5	2.7	11/23/05	12/03/05	5327169	
Lead 212	0.76		0.15	0.14	11/23/05	12/03/05	5327169	
Lead 214	1.09		0.24	0.19	11/23/05	12/03/05	5327169	
Potassium 40	23.0		3.8	1.0	11/23/05	12/03/05	5327169	
Radium (226)	0.92		0.28	0.47	11/23/05	12/03/05	5327169	
Radium 228	0.53		0.33	0.42	11/23/05	12/03/05	5327169	
Radium 224	4.5		2.7	2.5	11/23/05	12/03/05	5327169	
Thallium 208	0.22		0.11	0.1	11/23/05	12/03/05	5327169	
Thorium 232	0.53		0.33	0.42	11/23/05	12/03/05	5327169	
Thorium 234	0.7	U	1.1	2.1	11/23/05	12/03/05	5327169	
Uranium 238	0.7	U	1.1	2.1	11/23/05	12/03/05	5327169	
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g	A-01-R MOD			
Thorium 228	0.77	J	0.19	0.07	11/23/05	11/28/05	5327105	95
Thorium 230	1.34		0.27	0.04	11/23/05	11/28/05	5327105	95
Thorium 232	0.75	J	0.19	0.03	11/23/05	11/28/05	5327105	95

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K210216
Matrix: SOLID

			Total Uncert.	Lab Sample ID				
Parameter	Result	Qual	(2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (LONG CT) DOE A-01-R MOD			pCi/g	A-01-R MOD	F5K230000-105B			
Thorium 228	0.005	U	0.017	0.030	11/23/05	11/28/05	5327105	92
Thorium 230	0.024	J	0.024	0.013	11/23/05	11/28/05	5327105	92
Thorium 232	0.003	U	0.011	0.024	11/23/05	11/28/05	5327105	92
Gamma Ra-226 & Hits By DOE GA-01-R Mod.			pCi/g	GA-01-R MOD	F5K230000-169B			
Actinium 228	0.09	U	0.11	0.28	11/23/05	12/03/05	5327169	
Bismuth 212	-0.01	U	0.27	0.53	11/23/05	12/03/05	5327169	
Bismuth 214	0.104	U	0.083	0.19	11/23/05	12/03/05	5327169	
Lead 210	-0.29	U	0.55	1.2	11/23/05	12/03/05	5327169	
Lead 212	0.016	U	0.049	0.099	11/23/05	12/03/05	5327169	
Lead 214	0.091	U	0.079	0.17	11/23/05	12/03/05	5327169	
Potassium 40	-0.02	U	0.29	0.77	11/23/05	12/03/05	5327169	
Radium (226)	0.104	U	0.083	0.19	11/23/05	12/03/05	5327169	
Radium 228	0.09	U	0.11	0.28	11/23/05	12/03/05	5327169	
Radium 224	-0.51	U	0.61	0.86	11/23/05	12/03/05	5327169	
Thallium 208	-0.021	U	0.041	0.077	11/23/05	12/03/05	5327169	
Thorium 232	0.09	U	0.11	0.28	11/23/05	12/03/05	5327169	
Thorium 234	-0.18	U	0.45	0.91	11/23/05	12/03/05	5327169	
Uranium 238	-0.18	U	0.45	0.91	11/23/05	12/03/05	5327169	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Severn Trent Laboratories - Radiochemistry

Client Lot ID: FSK210216
Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert. (2 σ +/-)	MDC	% Yld	% Rec	Lab Sample ID QC Control Limits
Iso THORIUM (LONG CT) DOE A-01-R MOD			pCi/g	A-01-R MOD			F5K230000-105C
Thorium 230	58.5	55.3	7.3	0.2	94	95	(62 - 141)
	Batch #:	5327105		Analysis Date:	11/28/05		
Gamma Ra-226 & Hits By DOE GA-01-R			pCi/g	GA-01-R MOD			F5K230000-169C
Mod.							
Radium (226)	12.2	10.3	1.5	0.5		84	(75 - 135)
Thorium 232	9.50	8.6	1.6	0.8		91	(75 - 135)
	Batch #:	5327169		Analysis Date:	12/03/05		

NOTE(S)

MDC is determined by instrument performance only.
Calculations are performed before rounding to avoid round-off error in calculated results

DUPLICATE EVALUATION REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K210216
Matrix: SOLID

Date Sampled: 11/15/05
Date Received: 11/21/05

Parameter	SAMPLE Result	Total Uncert. (2σ +/-)	% Yld	DUPLICATE Result	Total Uncert. (2σ +/-)	% Yld	QC Sample ID Precision
Iso THORIUM (LONG CT) DOE A-01-R MOD			pCi/g	A-01-R MOD			F5K210216-001
Thorium 228	1.64	0.36	73	2.14	0.43	73	26 %RPD
Thorium 230	2.55	0.49	73	3.14	0.56	73	21 %RPD
Thorium 232	1.72	0.37	73	1.90	0.39	73	10 %RPD
Batch #:		5327105 (Sample)		5327105 (Duplicate)			
Gamma Ra-226 & Hits By DOE GA-01-R Mod.			pCi/g	GA-01-R MOD			F5K210216-001
Actinium 228	3.3	1.2		2.04	0.81		46 %RPD
Bismuth 212	2.0 U	1.1		1.23 U	0.99		49 %RPD
Bismuth 214	3.38	0.70		3.19	0.64		6 %RPD
Lead 210	4.7 U	3.2		1.9 U	2.4		85 %RPD
Lead 212	3.18	0.51		2.51	0.41		23 %RPD
Lead 214	3.53	0.66		3.83	0.65		8 %RPD
Potassium 40	22.6	4.7		17.2	3.6		27 %RPD
Radium (226)	3.38	0.70		3.19	0.64		6 %RPD
Radium 224	11.0	6.5		6.4	3.8		54 %RPD
Radium 228	3.26	0.98		2.04	0.69		46 %RPD
Thallium 208	0.89	0.24		0.83	0.21		6 %RPD
Thorium 232	3.26	0.98		2.04	0.69		46 %RPD
Thorium 234	3.7 U	3.2		3.5 U	2.1		4 %RPD
Uranium 238	3.7 U	3.1		3.5 U	2.1		4 %RPD
Batch #:		5327169 (Sample)		5327169 (Duplicate)			

NOTE(S)

Data are incomplete without the case narrative.
Calculations are performed before rounding to avoid round-off error in calculated results
U Result is less than the sample detection limit.

F5K210216**CLIENT ANALYSIS SUMMARY**

Storage Loc:

RAD

Project Manager: DPR

Quote #: 66630

SDG:

Date Received:

2005-11-21

Project:

Forrestal Village

Analytical Due Date:

2005-11-30

PO#:

MDC11540001

Report to: Jeff Lively

Report Due Date:

2005-12-03

Client:

508234

MACTEC Engineering and Consulting Inc

Report Type: D

Expanded Deliverable

#SMPS in LOT: 3

EDD Code: 00

Log both 10 and 21 day ingrowth for Gamma.

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>Site ID</u>	<u>Client Matrix</u>	<u>DATE/TIME SAMPLED</u>	<u>WORKORDER</u>	<u>A</u>
1	#30 SOIL			2005-11-15 / 1531	HQN8G	SOLID
<u>SAMPLE COMMENTS:</u>						
XX 0B EML	GA-01-R MOD	GM	Dry, Grind, Fill Geometry - 10-DAY INGROWTH	01 STANDARD TEST SET	PROT: A WRK LOC	06
XX 20 EML	A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01 STANDARD TEST SET	PROT: A WRK LOC	06
<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>Site ID</u>	<u>Client Matrix</u>	<u>DATE/TIME SAMPLED</u>	<u>WORKORDER</u>	<u>A</u>
2	#30 ROCK			2005-11-15 / 1531	HQN8H	SOLID
<u>SAMPLE COMMENTS:</u>						
XX ZZ NONE NONE	Archive	88	NO SAMPLE PREPARATION PERFORMED / DIRECT	01 STANDARD TEST SET	PROT: A WRK LOC	06
<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>Site ID</u>	<u>Client Matrix</u>	<u>DATE/TIME SAMPLED</u>	<u>WORKORDER</u>	<u>A</u>
3	#31 SOIL			2005-11-15 / 1640	HQN8J	SOLID
<u>SAMPLE COMMENTS:</u>						
XX 0B EML	GA-01-R MOD	GM	Dry, Grind, Fill Geometry - 10-DAY INGROWTH	01 STANDARD TEST SET	PROT: A WRK LOC	06
XX 20 EML	A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01 STANDARD TEST SET	PROT: A WRK LOC	06

SEVERN
TRENT

STL

Lot No(s) F5K 210216
218

(Note all associated lot No's)

Condition Upon Receipt Form
St. Louis LaboratoryClient: Mactec COC/RFA No: N/A Date: 11-21-05
Quote No: 666630 Initiated By: QC Time: 0915

Shipping Information

Shipper Name: Fed Ex Multiple Packages: Y N N/A
Shipper No(s):* 1. 9549 1550 3458 Sample Temperature(s):** 1. Ambient
2. _____ 2. _____
3. _____ 3. _____
4. _____ 4. _____
5. _____ 5. _____

*Numbered shipping lines correspond to Numbered Sample Temp lines.

**Sample must be received at 4°C ± 2°C. If not, note contents below.
Temperature variance does NOT affect the following analysis/matrix: Metals-Liquid
Rad tests - Liquids or Solids.

Condition/Variance (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1. <input checked="" type="radio"/> Y <input type="radio"/> N	Sample received in undamaged condition?	7. <input checked="" type="radio"/> Y <input type="radio"/> N	Sample received with Chain of Custody?
2. <input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Sample received with proper pH? (N/A for soil samples) If NO: sample ID _____ Preservative _____ Lot _____ Date _____ Time _____ Sticker applied Y/N	8. <input checked="" type="radio"/> Y <input type="radio"/> N	Chain of Custody matches sample IDs on container(s)?
3. <input type="radio"/> Y <input type="radio"/> N	If N/A-Was pH taken by original STL Lab?	9. <input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal received intact?
4. <input checked="" type="radio"/> Y <input type="radio"/> N	Sample received in proper containers?	10. <input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal tamper evident?
5. <input checked="" type="radio"/> Y <input type="radio"/> N	Sample volume sufficient for analysis?	11. <input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal on bottles intact?
6. <input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Headspace in VOA or TOX liquid samples? (If yes, note sample ID's below)	12. <input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal tamper evident?
¹ For DOE-AL (Pantex, LANL, Sandia) sites, verify pH of all containers received, EXCEPT VOA, TOX, and soils.		13. <input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Was Internal COC/CUR rec'd?

Notes:

PM Notified of Short Hold samples: Y N PM Initials: _____

Corrective Action:

☐ Client's Name: _____ Informed by: _____ By: _____
☐ Sample(s) processed "as is". _____
☐ Sample(s) on hold until: _____ If released, notify: _____
Project Management Review: [Signature]Date: 11/22/05

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

2074

ADMIN-0004, REVISED 10/06/05
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STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Tel: 314 298 8566 Fax: 314 298 8757
www.stl-inc.com

ANALYTICAL REPORT

Forrestal Village

Lot #: F5K160350

Jeff Lively

**Mactec Engineering & Consultin
751 Horizon Court
Suite 104
Grand Junction, CO 81506**

SEVERN TRENT LABORATORIES, INC.

A handwritten signature in black ink, appearing to read "David Rekosh".

**David Rekosh
Project Manager**

December 6, 2005

Leaders in Environmental Testing

Severn Trent Laboratories, Inc.

Case Narrative
LOT NUMBER: F5K160350

This report contains the analytical results for the seven samples received under chain of custody by STL St. Louis on November 16, 2005. These samples are associated with your Forrestal Village project.

The analytical results included in this report meet all applicable quality control procedure requirements.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

There were no observations or nonconformances associated with the analysis of these samples.

METHODS SUMMARY

F5K160350

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Gamma Spectroscopy - Radium-226 & Hits	EML GA-01-R MOD	

References:

EML "ENVIRONMENTAL MEASUREMENTS LABORATORY PROCEDURES MANUAL"
HASL-300 28TH EDITION, VOLUME I and II DEPARTMENT OF ENERGY

SAMPLE SUMMARY

F5K160350

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
HQCPW	001	HS01-01	11/12/05	08:15
HQCPX	002	HS01-03	11/12/05	08:40
HQCP0	003	HS02-04	11/12/05	10:17
HQCP2	004	HS03-01	11/12/05	11:45
HQCP3	005	HS02-18	11/12/05	09:48
HQCP5	006	GL01-01	11/13/05	15:30
HQCP7	007	HS15-01	11/13/05	16:01

NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS01-01

Sewern Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-001
Work Order: HOCPW
Matrix: SOLID

Date Collected: 11/12/05 0815
Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	28.2		6.9	0.7	11/18/05	12/02/05	5322158	
Bismuth 212	18.6		3.2	2.1	11/18/05	12/02/05	5322158	
Bismuth 214	3.63		0.81	0.50	11/18/05	12/02/05	5322158	
Lead 210	1.6	U	3.5	6.1	11/18/05	12/02/05	5322158	
Lead 212	28.7		3.6	0.4	11/18/05	12/02/05	5322158	
Lead 214	3.48		0.60	0.49	11/18/05	12/02/05	5322158	
Potassium 40	18.9		3.8	2.1	11/18/05	12/02/05	5322158	
Protactinium 234M	-2	U	13	23	11/18/05	12/02/05	5322158	
Radium (226)	3.63		0.81	0.50	11/18/05	12/02/05	5322158	
Radium 228	28.2		3.7	0.7	11/18/05	12/02/05	5322158	
Radium 224	29		16	4	11/18/05	12/02/05	5322158	
Thallium 208	9.9		1.4	0.3	11/18/05	12/02/05	5322158	
Thorium 232	28.2		3.7	0.7	11/18/05	12/02/05	5322158	
Thorium 234	3.2	U	3.5	5.9	11/18/05	12/02/05	5322158	
Uranium 238	3.2	U	3.5	5.9	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS01-01 DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-001X

Date Collected: 11/12/05 0815

Work Order: HOCPW

Date Received: 11/16/05 0900

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	27.4		6.7	0.8	11/18/05	12/02/05	5322158	
Bismuth 212	18.3		3.4	2.0	11/18/05	12/02/05	5322158	
Bismuth 214	2.95		0.68	0.51	11/18/05	12/02/05	5322158	
Lead 210	-0.07	U	3.2	5.4	11/18/05	12/02/05	5322158	
Lead 212	28.0		3.5	0.4	11/18/05	12/02/05	5322158	
Lead 214	3.73		0.65	0.42	11/18/05	12/02/05	5322158	
Potassium 40	19.4		4.2	2.2	11/18/05	12/02/05	5322158	
Protactinium 234M	7	U	14	25	11/18/05	12/02/05	5322158	
Radium (226)	2.95		0.68	0.51	11/18/05	12/02/05	5322158	
Radium 228	27.4		3.5	0.8	11/18/05	12/02/05	5322158	
Radium 224	32		17	4	11/18/05	12/02/05	5322158	
Thallium 208	9.0		1.3	0.3	11/18/05	12/02/05	5322158	
Thorium 232	27.4		3.5	0.8	11/18/05	12/02/05	5322158	
Thorium 234	4.4	U	3.2	5.3	11/18/05	12/02/05	5322158	
Uranium 238	4.4	U	3.1	5.3	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS01-03

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-002

Date Collected: 11/12/05 0840

Work Order: HOC PX

Date Received: 11/16/05 0900

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	81		19	1	11/18/05	12/02/05	5322158	
Bismuth 212	52.9		7.8	3.4	11/18/05	12/02/05	5322158	
Bismuth 214	8.7		1.5	0.8	11/18/05	12/02/05	5322158	
Lead 210	4.1	U	4.8	8.3	11/18/05	12/02/05	5322158	
Lead 212	87		11	0.6	11/18/05	12/02/05	5322158	
Lead 214	9.7		1.4	0.7	11/18/05	12/02/05	5322158	
Potassium 40	15.5		3.5	5.8	11/18/05	12/02/05	5322158	
Protactinium 234M	2	U	22	38	11/18/05	12/02/05	5322158	
Radium (226)	8.7		1.5	0.8	11/18/05	12/02/05	5322158	
Radium 228	81.1		9.5	1.1	11/18/05	12/02/05	5322158	
Radium 224	90		50	6	11/18/05	12/02/05	5322158	
Thallium 208	28.5		4.1	0.4	11/18/05	12/02/05	5322158	
Thorium 232	81.1		9.5	1.1	11/18/05	12/02/05	5322158	
Thorium 234	9.4		5.1	8.2	11/18/05	12/02/05	5322158	
Uranium 238	9.4		4.9	8.2	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS02-04

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-003

Work Order: HOCPO

Matrix: SOLID

Date Collected: 11/12/05 1012

Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	2.19		0.91	0.66	11/18/05	12/02/05	5322158	
Bismuth 212	2.15		0.94	1.9	11/18/05	12/02/05	5322158	
Bismuth 214	9.6		1.3	0.3	11/18/05	12/02/05	5322158	
Lead 210	2.8	U	2.6	4.6	11/18/05	12/02/05	5322158	
Lead 212	1.61		0.28	0.28	11/18/05	12/02/05	5322158	
Lead 214	10.0		1.3	0.3	11/18/05	12/02/05	5322158	
Potassium 40	16.6		3.2	1.9	11/18/05	12/02/05	5322158	
Protactinium 234M	16	U	15	21	11/18/05	12/02/05	5322158	
Radium (226)	9.6		1.3	0.3	11/18/05	12/02/05	5322158	
Radium 228	2.19		0.79	0.66	11/18/05	12/02/05	5322158	
Radium 224	16.8		9.5	5.2	11/18/05	12/02/05	5322158	
Thallium 208	0.50		0.17	0.16	11/18/05	12/02/05	5322158	
Thorium 232	2.19		0.79	0.66	11/18/05	12/02/05	5322158	
Thorium 234	6.8		3.5	3.5	11/18/05	12/02/05	5322158	
Uranium 238	6.8		3.3	3.5	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS03-01

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-004

Work Order: HOC2

Matrix: SOLID

Date Collected: 11/12/05 1145

Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	9.7		2.5	0.5	11/18/05	12/02/05	5322158	
Bismuth 212	6.9		1.9	1.4	11/18/05	12/02/05	5322158	
Bismuth 214	1.47		0.40	0.31	11/18/05	12/02/05	5322158	
Lead 210	0.2	U	2.0	3.5	11/18/05	12/02/05	5322158	
Lead 212	9.8		1.2	0.2	11/18/05	12/02/05	5322158	
Lead 214	1.80		0.38	0.27	11/18/05	12/02/05	5322158	
Potassium 40	15.2		3.2	1.2	11/18/05	12/02/05	5322158	
Protactinium 234M	9	U	10	20	11/18/05	12/02/05	5322158	
Radium (226)	1.47		0.40	0.31	11/18/05	12/02/05	5322158	
Radium 228	9.7		1.5	0.5	11/18/05	12/02/05	5322158	
Radium 224	11.8		6.7	2.3	11/18/05	12/02/05	5322158	
Thallium 208	3.20		0.52	0.16	11/18/05	12/02/05	5322158	
Thorium 232	9.7		1.5	0.5	11/18/05	12/02/05	5322158	
Thorium 234	2.5	U	2.0	3.5	11/18/05	12/02/05	5322158	
Uranium 238	2.5	U	2.0	3.5	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS02-18

Savern Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-005

Work Order: HOCPP

Matrix: SOLID

Date Collected: 11/12/05 0948

Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	27.9		6.9	0.8	11/18/05	12/02/05	5322158	
Bismuth 212	19.4		3.8	2.4	11/18/05	12/02/05	5322158	
Bismuth 214	4.88		0.85	0.52	11/18/05	12/02/05	5322158	
Lead 210	3.1	U	4.1	7.1	11/18/05	12/02/05	5322158	
Lead 212	29.5		3.7	0.4	11/18/05	12/02/05	5322158	
Lead 214	5.09		0.86	0.54	11/18/05	12/02/05	5322158	
Potassium 40	22.1		4.4	2.2	11/18/05	12/02/05	5322158	
Protactinium 234M	-14	U	17	27	11/18/05	12/02/05	5322158	
Radium (226)	4.88		0.85	0.52	11/18/05	12/02/05	5322158	
Radium 228	27.9		3.8	0.8	11/18/05	12/02/05	5322158	
Radium 224	34		19	5	11/18/05	12/02/05	5322158	
Thallium 208	9.3		1.3	0.3	11/18/05	12/02/05	5322158	
Thorium 232	27.9		3.8	0.8	11/18/05	12/02/05	5322158	
Thorium 234	9.6		4.5	7.1	11/18/05	12/02/05	5322158	
Uranium 238	9.6		4.2	7.1	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: GL01-01

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-006

Work Order: HOCPS

Matrix: SOLID

Date Collected: 11/13/05 1530

Date Received: 11/16/05 0900

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	18.4		4.5	0.6	11/18/05	12/02/05	5322158	
Bismuth 212	12.7		2.7	1.6	11/18/05	12/02/05	5322158	
Bismuth 214	2.98		0.60	0.38	11/18/05	12/02/05	5322158	
Lead 210	1.1	U	2.5	4.5	11/18/05	12/02/05	5322158	
Lead 212	19.8		2.5	0.3	11/18/05	12/02/05	5322158	
Lead 214	2.61		0.60	0.37	11/18/05	12/02/05	5322158	
Potassium 40	19.2		3.4	1.8	11/18/05	12/02/05	5322158	
Protactinium 234M	-4	U	11	19	11/18/05	12/02/05	5322158	
Radium (226)	2.98		0.60	0.38	11/18/05	12/02/05	5322158	
Radium 228	18.4		2.4	0.6	11/18/05	12/02/05	5322158	
Radium 224	21		12	3	11/18/05	12/02/05	5322158	
Thallium 208	6.46		0.98	0.21	11/18/05	12/02/05	5322158	
Thorium 232	18.4		2.4	0.6	11/18/05	12/02/05	5322158	
Thorium 234	1.2	U	2.6	4.5	11/18/05	12/02/05	5322158	
Uranium 238	1.2	U	2.6	4.5	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

MACTEC Engineering and Consulting Inc

Client Sample ID: HS15-01

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F5K160350-007

Date Collected: 11/13/05 1603

Work Order: HOC7

Date Received: 11/16/05 0900

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				pCi/g	GA-01-R MOD			
Actinium 228	5.9		1.6	0.5	11/18/05	12/02/05	5322158	
Bismuth 212	3.1		1.2	1.2	11/18/05	12/02/05	5322158	
Bismuth 214	1.53		0.36	0.27	11/18/05	12/02/05	5322158	
Lead 210	-0.5	U	2.1	3.7	11/18/05	12/02/05	5322158	
Lead 212	5.80		0.78	0.23	11/18/05	12/02/05	5322158	
Lead 214	1.51		0.36	0.28	11/18/05	12/02/05	5322158	
Potassium 40	14.8		2.9	1.6	11/18/05	12/02/05	5322158	
Protactinium 234M	1.7	U	8.1	16	11/18/05	12/02/05	5322158	
Radium (226)	1.53		0.36	0.27	11/18/05	12/02/05	5322158	
Radium 228	5.9		1.1	0.5	11/18/05	12/02/05	5322158	
Radium 224	6.6		3.9	2.5	11/18/05	12/02/05	5322158	
Thallium 208	2.11		0.37	0.17	11/18/05	12/02/05	5322158	
Thorium 232	5.9		1.1	0.5	11/18/05	12/02/05	5322158	
Thorium 234	1.9	U	1.9	3.4	11/18/05	12/02/05	5322158	
Uranium 238	1.9	U	1.8	3.4	11/18/05	12/02/05	5322158	
--- Other Detected Radionuclides ---								
Cesium 137	0.37		0.17	0.16	11/18/05	12/02/05	5322158	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K160350
Matrix: SOLID

Parameter	Result	Qual	Total Uncert.	MDC	Lab Sample ID				
			(2 σ +/-)		Prep Date	Analysis Date	Batch #	Yld %	
Gamma Ra-226 & Hits	By DOE	GA-01-R	Mod.	pCi/g	GA-01-R	MOD	F5K180000-158B		
Actinium 228	0.13	U	0.11	0.28	11/18/05	12/02/05	5322158		
Bismuth 212	-0.03	U	0.19	0.38	11/18/05	12/02/05	5322158		
Bismuth 214	0.074	U	0.066	0.15	11/18/05	12/02/05	5322158		
Lead 210	-0.20	U	0.51	1.0	11/18/05	12/02/05	5322158		
Lead 212	0.007	U	0.042	0.081	11/18/05	12/02/05	5322158		
Lead 214	0.060	U	0.057	0.13	11/18/05	12/02/05	5322158		
Potassium 40	0.22	U	0.28	0.81	11/18/05	12/02/05	5322158		
Protactinium 234M	1.8	U	3.6	8.4	11/18/05	12/02/05	5322158		
Radium (226)	0.074	U	0.066	0.15	11/18/05	12/02/05	5322158		
Radium 228	0.13	U	0.11	0.28	11/18/05	12/02/05	5322158		
Radium 224	-0.24	U	0.42	0.67	11/18/05	12/02/05	5322158		
Thallium 208	0.012	U	0.027	0.062	11/18/05	12/02/05	5322158		
Thorium 232	0.13	U	0.11	0.28	11/18/05	12/02/05	5322158		
Thorium 234	0.21	U	0.42	0.86	11/18/05	12/02/05	5322158		
Uranium 238	0.21	U	0.42	0.86	11/18/05	12/02/05	5322158		

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K160350
Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert:	MDC	% Yld	% Rec	Lab Sample ID
			(2 σ +/-)				QC Control Limits
Gamma Ra-226 & Hits By DOE GA-01-R			pCi/g	GA-01-R MOD		F5K180000-158C	
Mod.							
Radium (226)	12.2	10.8	1.5	0.4		88	(75 - 135)
Thorium 232	9.50	9.5	1.6	0.8		100	(75 - 135)
Batch #:			5322158	Analysis Date: 12/02/05			

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

DUPLICATE EVALUATION REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F5K160350
Matrix: SOLID

Date Sampled: 11/12/05
Date Received: 11/16/05

Parameter	SAMPLE Result	Total Uncert. (2σ+/-)	% Yld	DUPLICATE Result	Total Uncert. (2σ+/-)	% Yld	QC Sample ID Precision
Gamma Ra-226 & Hits By DOE GA-01-R Mod.				GA-01-R MOD		F5K160350-001	
Actinium 228	28.2	6.9		27.4	6.7	3	%RPD
Bismuth 212	18.6	3.2		18.3	3.4	2	%RPD
Bismuth 214	3.63	0.81		2.95	0.68	21	%RPD
Lead 210	1.6	3.5	U	-0.07	3.2	219	%RPD
Lead 212	28.7	3.6		28.0	3.5	2	%RPD
Lead 214	3.48	0.60		3.73	0.65	7	%RPD
Potassium 40	18.9	3.8		19.4	4.2	2	%RPD
Protactinium 234M	-2	13	U	7	14	342	%RPD
Radium (226)	3.63	0.81		2.95	0.68	21	%RPD
Radium 224	29	16		32	17	9	%RPD
Radium 228	28.2	3.7		27.4	3.5	3	%RPD
Thallium 208	9.9	1.4		9.0	1.3	9	%RPD
Thorium 232	28.2	3.7		27.4	3.5	3	%RPD
Thorium 234	3.2	3.5	U	4.4	3.2	32	%RPD
Uranium 238	3.2	3.5	U	4.4	3.1	32	%RPD
Batch #:		5322158 (Sample)		5322158 (Duplicate)			

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off error in calculated results

U Result is less than the sample detection limit.

F5K160350

CLIENT ANALYSIS SUMMARY

Storage Loc:

RAD

Project Manager: DPR

Quote #: 66630

SDG:

Date Received:

2005-11-16

Project:

Forrestal Village

Analytical Due Date:

2005-12-07

PO#: MDC11540001

Report to: Jeff Lively

Report Due Date:

2005-12-09

Client: 508234 MACTEC Engineering and Consulting Inc

#SMPS in LOT: 0

Report Type: D

Expanded Deliverable

EDD Code: 00

Log both 10 and 21 day ingrowth for Gamma.

SAMPLE #	CLIENT SAMPLE ID	Site ID	Client Matrix	DATE/TIME SAMPLED	WORKORDER	A
1	HS01-01			2005-11-12 / 815	HQCPW	SOLID

SAMPLE COMMENTS:

XX	OB	EML	GA-01-R MOD	Gamma Ra-226 & Hits By DOE GA-01-R Mod.	G6	Dry, Grind, and Fill Geometry	01	STANDARD TEST SET	PROT: A	WRK LOC	06
----	----	-----	----------------	--	----	----------------------------------	----	-------------------	---------	------------	----

SAMPLE #	CLIENT SAMPLE ID	Site ID	Client Matrix	DATE/TIME SAMPLED	WORKORDER	A
2	HS01-03			2005-11-12 / 840	HQCPX	SOLID

SAMPLE COMMENTS:

XX	OB	EML	GA-01-R MOD	Gamma Ra-226 & Hits By DOE GA-01-R Mod.	G6	Dry, Grind, and Fill Geometry	01	STANDARD TEST SET	PROT: A	WRK LOC	06
----	----	-----	----------------	--	----	----------------------------------	----	-------------------	---------	------------	----

SAMPLE #	CLIENT SAMPLE ID	Site ID	Client Matrix	DATE/TIME SAMPLED	WORKORDER	A
3	HS02-04			2005-11-12 / 1012	HQCP0	SOLID

SAMPLE COMMENTS:

XX	OB	EML	GA-01-R MOD	Gamma Ra-226 & Hits By DOE GA-01-R Mod.	G6	Dry, Grind, and Fill Geometry	01	STANDARD TEST SET	PROT: A	WRK LOC	06
----	----	-----	----------------	--	----	----------------------------------	----	-------------------	---------	------------	----

SAMPLE #	CLIENT SAMPLE ID	Site ID	Client Matrix	DATE/TIME SAMPLED	WORKORDER	A
4	HS03-01			2005-11-12 / 1145	HQCP2	SOLID

SAMPLE COMMENTS:

XX	OB	EML	GA-01-R MOD	Gamma Ra-226 & Hits By DOE GA-01-R Mod.	G6	Dry, Grind, and Fill Geometry	01	STANDARD TEST SET	PROT: A	WRK LOC	06
----	----	-----	----------------	--	----	----------------------------------	----	-------------------	---------	------------	----

SAMPLE #	CLIENT SAMPLE ID	Site ID	Client Matrix	DATE/TIME SAMPLED	WORKORDER	A
5	HS02-18			2005-11-12 / 948	HQCP3	SOLID

SAMPLE COMMENTS:

XX	OB	EML	GA-01-R MOD	Gamma Ra-226 & Hits By DOE GA-01-R Mod.	G6	Dry, Grind, and Fill Geometry	01	STANDARD TEST SET	PROT: A	WRK LOC	06
----	----	-----	----------------	--	----	----------------------------------	----	-------------------	---------	------------	----

SAMPLE #	CLIENT SAMPLE ID	Site ID	Client Matrix	DATE/TIME SAMPLED	WORKORDER	A
6	GL01-01			2005-11-13 / 1530	HQCP5	SOLID

SAMPLE COMMENTS:

XX	OB	EML	GA-01-R MOD	Gamma Ra-226 & Hits By DOE GA-01-R Mod.	G6	Dry, Grind, and Fill Geometry	01	STANDARD TEST SET	PROT: A	WRK LOC	06
----	----	-----	----------------	--	----	----------------------------------	----	-------------------	---------	------------	----

SAMPLE #	CLIENT SAMPLE ID	Site ID	Client Matrix	DATE/TIME SAMPLED	WORKORDER	A
7	HS15-01			2005-11-13 / 1603	HQCP7	SOLID

SAMPLE COMMENTS:

XX	OB	EML	GA-01-R MOD	Gamma Ra-226 & Hits By DOE GA-01-R Mod.	G6	Dry, Grind, and Fill Geometry	01	STANDARD TEST SET	PROT: A	WRK LOC	06
----	----	-----	----------------	--	----	----------------------------------	----	-------------------	---------	------------	----

Shaded / Lab Use Only

Form No. _____



MACTEC, Inc.

751 Horizon Court
Suite 104
Grand Junction, CO
81506

CHAIN OF CUSTODY FORM

Page 1 of 1

Agreed Turnaround Time

☐ 24 hour ☐ 72 hour ☐ 5 Day
☐ 10 Day ☐ 3 Week ☐ Other

Lab Batch No.

Seals Intact?

☐ Yes ☐ No ☐ NA

Lab ID:

Shipping Container Damage?

☐ Yes ☐ No ☐ NA

PROJECT INFO

LABORATORY INFO

INVOICE (if other than MACTEC contact)

MACTEC Contact

Jeff Lively

Project No.

9120051154

Laboratory Name

Severn Trent Labs

Phone

314 298 8546

Project Title/No.

Forestal Village

Purchase Order No.

NA

Laboratory Contact

John Powell

Fax

314 298 8757

Company Name

Phone

Company Contact

Fax

Address

Forestal Village

Address

13715 Rider Trail North

City/State/Zip

Great Lakes NTS IL

City/State/Zip

Earth City, MO 63045

Address

City/State/Zip

Special Handling Instructions

ib Sample No.	Date/Time Collected	Sample ID	Sample Type ¹	Sample Media ²	Composite (G)rab	Sample Volume	Sample Location/Depth/Fraction/Etc. (describe if necessary)	Requested Analysis	Alpha Spec TH	Gamma Spec 10 day turn	Gamma Spec 21 day turn	Coll					
	11/12/05 0805	HS01-01	RS	VOL	G	500 ml			✓	✓	✓						500P
	11/12/05 0840	HS01-03	RS	Vol	G	500 ml			✓	✓	✓						
	11/12/05 0815	RO1-01	RS	OTH			Slag sample (rock)					✓					
	11/12/05 1012	HS02-04	RS	Vol	G	500 ml			✓	✓	✓						
	11/12/05 1012	RO2-04	RS	OTH			Slag sample (rock)					✓					
	11/12/05 1145	HS03-01	RS	Vol	G	500 ml			✓	✓	✓						
	11/12/05 0948	HS02-18	RS	Vol	G	500 ml			✓	✓	✓						
	11/18/05 1530	GL01-01	RS	Vol	G	500 ml			✓	✓	✓						
	11/13/05 1603	HS15-01	RS	Vol	G	500 ml			✓	✓	✓						

¹Type
O - In-Vitro
3 - Rad
4 - Environ.
IX - Rad + Chem
1Z - Hazardous
TH - Other (describe)

²Sample Media
VOL - Volumetric
AF - Air Filter
WIPE - Smear
LIQ - Liquid
OTH - Other (describe)

³Analysis Requested
ALPHA - Alpha Spec.
GROSS - Gross beta/gamma
GAMMA - Gamma Spec.
LSC - Liquid Scintillation
OTH - Other (describe)

Relinquished by:
Date/Time
Received by:
Date/Time
Relinquished by:
Date/Time
Received by:
Date/Time

11-14-05 1349
11-16-05 0900

Relinquished by:
Date/Time
Received by:
Date/Time
Relinquished by:
Date/Time
Received by:
Date/Time

WHITE: Laboratory Copy

YELLOW: Report Copy

PINK: MACTEC Copy

Attachment 1
Form RPO-805-0-1

SEVERN
TRENT

STL

Lot No(s) F5K160344349350

(Note all associated lot No's)

Condition Upon Receipt Form
St. Louis LaboratoryClient:
Quote No:Mackee
66630COC/RFA No:
Initiated By:N/A
8Date:
Time:11-16-05
0900

Shipping Information

Shipper Name:
Shipper No(s):*FedEx
1. 8549 1550 3800
2. _____
3. _____
4. _____
5. _____Multiple Packages:
Sample Temperature(s):**Y N N/A
1. ambient
2. _____
3. _____
4. _____
5. _____

*Numbered shipping lines correspond to Numbered Sample Temp lines.

**Sample must be received at 4°C ± 2°C. If not, note contents below.
Temperature variance does NOT affect the following analysis/matrix: Metals-Liquid
Rad test - Liquids or Solids.

Condition/Variance (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1.	<input checked="" type="radio"/> Y <input type="radio"/> N	Sample received in undamaged condition?	7.	<input checked="" type="radio"/> Y <input type="radio"/> N	Sample received with Chain of Custody?
2.	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Sample received with proper pH ¹ ? (N/A for soil samples) If NO: sample ID _____ Preservative _____ Lot _____ Date _____ Time _____ Sticker applied Y/N _____	8.	<input checked="" type="radio"/> Y <input type="radio"/> N	Chain of Custody matches sample IDs on container(s)?
3.	<input type="radio"/> Y <input type="radio"/> N	If N/A - Was pH taken by original STL Lab?	9.	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal received intact?
4.	<input checked="" type="radio"/> Y <input type="radio"/> N	Sample received in proper containers?	10.	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal tamper evident?
5.	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> ?	Sample volume sufficient for analysis?	11.	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal on bottles intact?
6.	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Headspace in VOA or TOX liquid samples? (If yes, note sample ID's below)	12.	<input type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> N/A	Custody seal tamper evident?
¹ For DOE-AL (Pantex, LANL, Sandia) sites, verify pH of all containers received, EXCEPT VOA, TOX, and soils.			13.	<input type="radio"/> Y <input type="radio"/> N <input type="radio"/> N/A	Was Internal COC/CUR rec'd?

Notes:

Slag samples are very light!

PM Notified of Short Hold samples: Y N PM Initials:

Corrective Action:

☐ Client's Name: _____

Informed by: _____ By: _____

☐ Sample(s) processed "as is". _____☐ Sample(s) on hold until: _____

If released, notify: _____

Project Management Review:

Date: 11/17/05

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

APPENDIX B

**Surface Soil Screening Levels
U.S. Nuclear Regulatory Commission**

Week of December 6

Wednesday, December 8

- 9:25 a.m. Affirmation Session (Public Meeting)
- a. Final Amendments to 10 CFR Parts 21, 50 & 54 & Availability for Public Comment of Draft Reg Guide DG-1081 & Draft Standard Review Plan of Section 15.0.1 Regarding Use of Alternative Source Terms at Operating Reactors (Tentative) (Contact: Ken Hart, 301-415-1659).

Week of December 13—Tentative

Wednesday, December 15

- 9:25 a.m. Affirmation Session (Public Meeting) (if needed)
- 9:30 a.m. Meeting with Advisory Committee on Nuclear Waste (ACNW) (Public Meeting) (Contact: Dr. John Larkins, 301-415-7360)

Thursday, December 16

- 9:00 a.m. Meeting on NRC Response to Stakeholders' Concerns Location: (NRC Auditorium, Two White Flint North)

Friday, December 17

- 9:30 a.m. Briefing on Status of RES Programs, Performance, and Plans (Including Status of Thermo-Hydraulics) (Public Meeting) (Contact: Jocelyn Mitchell, 301-415-5289)

Week of December 20—Tentative

Wednesday, December 22

- 11:30 a.m. Affirmation Session (Public Meeting) (if needed)

Week of December 27—Tentative

There are no meetings scheduled for the Week of December 27.

*The schedule for Commission meetings is subject to change on short notice. To verify the status of meetings call (recording)—(301) 415-1292. Contact person for more information: Bill Hill (301) 415-1661.

The NRC Commission Meeting Schedule can be found on the Internet at: <http://www.nrc.gov/SECY/smj/schedule.htm>

This notice is distributed by mail to several hundred subscribers; if you no longer wish to receive it, or would like to be added to it, please contact the Office of the Secretary, Attn: Operations Branch, Washington, D.C. 20555 (301-415-1661). In addition, distribution of this meeting notice over the Internet system is available. If you are interested in receiving this Commission meeting schedule electronically, please send an

electronic message to wmh@nrc.gov or dkw@nrc.gov.
William M. Hill, Jr.,
Secy, Tracking Officer, Office of the Secretary.
 [FR Doc. 99-31798 Filed 12-3-99; 2:21 pm]
 BILLING CODE 7590-01-M

NUCLEAR REGULATORY COMMISSION

Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination

Summary: This notice provides supplemental information regarding implementation of the Nuclear Regulatory Commission's (NRC) Final Rule on Radiological Criteria for License Termination (License Termination Rule (LTR)) which was issued on July 21, 1997, (62 FR 39058). This notice provides: (1) screening values for surface soil contamination release levels; and (2) information on additional NRC efforts in dose modeling. Supplemental information was also published in the *Federal Register* on November 18, 1998 (63 FR 64132). That notice provided information on: (1) The end of the "grandfathering period;" (2) issuance of draft Regulatory Guide "Demonstrating Compliance with the Radiological Criteria for License Termination" (DG-4006); (3) availability of DandD, version 1; (4) screening values for building surface contamination for beta/gamma radiation emitters (Table 1, Acceptable License Termination Screening Values of Common Radionuclides for Building Surface Contamination); (5) public workshops; (6) development of a decommissioning standard review plan (SRP); and (7) status of the NRC decommissioning guidance documents (Table 2, Existing Guidance Documents Applicable to Decommissioning That Will Require Revision or Discontinuation in Order to Implement the License Termination Rule).

Supplemental Information: As discussed in the November 18, 1998, *Federal Register* notice, the DandD code provides a method for calculating screening concentrations for radionuclides in soil, and screening levels for contamination on building surfaces. NRC staff also stated that, during the two-year interim use period for DG-4006, it planned to continue to refine the screening approach and to evaluate the extent of conservatism in the DandD code.

Several areas where DandD, version 1, may be overly conservative have been identified. One such conservatism is the

methodology used for selection of default parameters. Selection of highly conservative default parameters is essentially caused by the current screening design of establishing a single default parameter set for all radionuclides listed in the DandD code. That is, if the default parameter set was tailored for each radionuclide, rather than using a common default parameter set for all radionuclides, the dose calculated using DandD model would, in most cases, be lower. A detailed discussion of the way the default parameters were selected is contained in "Residual Contamination from Decommissioning—Parameter Analysis—Draft Report for Comment" (NUREG/CR-5512, Volume 3).

This artifact in the way the default parameters were selected has been discussed in several presentations at the NRC's public workshops (e.g., Public Workshops on Guidance for Implementing Title 10 Code of Federal Regulations (CFR), Subpart E, Radiological Criteria for License Termination) conducted in December 1998, and January, March, and June 1999. Currently, NRC staff is developing version 2.0 of the DandD code. This version of the code will calculate the default parameter values based on the specific radionuclides that are identified by the analyst. In the interim, NRC staff has calculated surface soil concentrations for a number of common radionuclides that correspond to an annual dose of 0.25 mSv (25 mrem) using the default parameters that are generated by the approach to be used in the new version of DandD. These values are presented in Table 3. For mixtures of radionuclides, a screening dose should be calculated using the sum-of-the-fractions' rule.

The values in Table 3 (Interim Screening Values (pCi/g) of Common Radionuclides for Soil Surface Contamination Levels) correspond to surface soil (e.g., top 15–30 cm) concentrations of radionuclide contamination that would be deemed in compliance with the unrestricted use dose limit in 10 CFR 20.1402 (i.e., 0.25 mSv/yr, (25 mrem/yr)). The values correspond to screening "derived concentration guidelines" (DCGLs) for each specific radionuclide based on the methodology described in DG-4006. Sites with surface soil contamination levels below those listed in Table 3 would be deemed acceptable for release for unrestricted use provided that residual radioactivity has been reduced to levels that are "as low as is reasonably achievable" (ALARA). This table is not applicable to sites with subsurface and/or with groundwater

contamination and a more comprehensive dose impact analysis would be required. The table is intended for use as screening criteria to facilitate license termination for many simple routine decommissioning cases that do not require a site-specific dose assessment. For facilities with contamination levels above those in Table 3, additional site-specific dose assessments may be necessary, and licensees should refer to DG-4006 regarding acceptable methods for conducting the appropriate dose assessment.

NRC staff has also prepared "Preliminary Guidelines for Evaluating Dose Assessments in Support of Decommissioning." The purpose of these guidelines is to provide a consistent approach for NRC staff to evaluate dose assessments conducted to demonstrate compliance with the LTR. This interim guidance was developed by NRC staff for reviewing dose assessments and may be useful to licensees preparing dose assessment during both screening and site-specific analyses. A copy of the guidance is available on the web site "http://techconf.llnl.gov/."

During our analysis of the basis for selecting the default parameter set for the DandD code, we discovered a transcription error in the soil-to-plant transfer factor for S-35. This error substantially overestimates the allowable DCGL for this radionuclide. The soil-to-plant transfer factor has been revised in DandD version 1 and posted on the above referenced web site. In addition, a "patch" to correct this problem for users that already have the code installed is also available from this web site.

The staff intends to consider placing Tables 1 and 3, revised as necessary, to reflect improvement in the DandD code in the Standard Review Plan for decommissioning, and/or in the next revision of the Regulatory Guide DG-4006. Comments on these Tables may be submitted within 30 days from the date of this notice to the Rules and Directives Branch, Division of Administrative Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

For Further Information Contact: For more information, contact Dr. Bobby Abu-Eid, High-Level Waste and Performance Assessment Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Telephone: (301) 415-5811; fax: (301) 415-5398; or email: bae@nrc.gov.

Dated at Rockville, Maryland, this 29th day of November 1999.

For the Nuclear Regulatory Commission,
Larry W. Camper,
Chief, Decommissioning Branch Division of
Waste Management, Office of Nuclear
Material Safety and Safeguards.

TABLE 3.¹—INTERIM SCREENING VALUES² (PC/G) OF COMMON RADIONUCLIDES FOR SOIL SURFACE CONTAMINATION LEVELS

Radionuclide	Surface soil screening values ³
H-3	1.1 E+02
C-14	1.2 E+01
Na-22	4.3 E+00
S-35	2.7 E+02
Cl-36	3.6 E-01
Ca-45	5.7 E+01
Sc-46	1.5 E+01
Mn-54	1.5 E+01
Fe-55	1.0 E+04
Co-57	1.5 E+02
Co-60	3.8 E+00
Ni-59	5.5 E+03
Ni-63	2.1 E+03
Sr-90	1.7 E+00
Nb-94	5.8 E+00
Tc-99	1.9 E+01
I-129	5.0 E-01
Cs-134	5.7 E+00
Cs-137	1.1 E+01
Eu-152	8.7 E+00
Eu-154	8.0 E+00
Ir-192	4.1 E+01
Pb-210	9.0 E-01
Ra-226	7.0 E-01
Ra-226+C ⁴	6.0 E-01
Ac-227	5.0 E-01
Ac-227+C	5.0 E-01
Th-228	4.7 E+00
Th-228+C	4.7 E+00
Th-230	1.8 E+00
Th-230+C	6.0 E-01
Th-232	1.1 E+00
Th-232+C	1.1 E+00
Pa-231	3.0 E-01
Pa-231+C	3.0 E-01
U-234	1.3 E+01
U-235	8.0 E+00
U-235+C	2.9 E-01
U-238	1.4 E+01
U-238+C	5.0 E-01
Pu-238	2.5 E+00
Pu-239	2.3 E+00
Pu-241	7.2 E+01
Am-241	2.1 E+00
Cm-242	1.6 E+02
Cm-243	3.2 E+00

¹ Tables 1 and 2 were published in the Federal Register on November 18, 1998, (63 FR 64132)

² These values represent superficial surface soil concentrations of individual radionuclides that would be deemed in compliance with the 25 mrem/y (0.25 mSv) unrestricted release dose limit in 10 CFR 20.1402. For radionuclides in a mixture, the "sum of fractions" rule applies; see Part 20, Appendix B, Note 4. Refer to NRC Draft Guidance DG-4006 for further information on application of the values in this table.

³ Screening values (pCi/g) equivalent to 25 mrem/y derived using DandD screening methodology (SNL Letter Report for NRC Project JCN W6227, January 30, 1998). These values were derived based on selection of the 90th Percentile of the output dose distribution for each specific radionuclide (or radionuclide with the specific decay chain). Behavioral parameters are set at the mean of the distribution of the assumed critical group. The Metabolic parameters are set at Standard Man or at the mean of the distribution for an average man.

⁴ "+"C" indicates a value for a radionuclide with its decay progeny present in equilibrium. The values are concentrations of the parent radionuclide, but account for contributions from the complete chain of progeny in equilibrium with the parent radionuclide.

[FR Doc. 99-31508 Filed 12-6-99; 8:45 am]

BILLING CODE 7590-01-P

RAILROAD RETIREMENT BOARD

Agency Forms Submitted for OMB Review

SUMMARY: In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35), the Railroad Retirement Board (RRB) has submitted the following proposal(s) for the collection of information to the Office of Management and Budget for review and approval.

SUMMARY OF PROPOSAL(S):

- (1) *Collection title:* Application for Survivor Death Benefits.
- (2) *Form(s) submitted:* AA-21, G-273a, AA-11a, G-131, and AA-21cert.
- (3) *OMB Number:* 3220-0031.
- (4) *Expiration date of current OMB clearance:* 2/28/2000.
- (5) *Type of request:* Revision of a currently approved collection.
- (6) *Respondents:* Individuals or Households, Business or other for-profit.
- (7) *Estimated annual number of respondents:* 20,600.
- (8) *Total annual responses:* 20,600.
- (9) *Total annual reporting hours:* 5,150.
- (10) *Collection description:* The collection obtains the information needed to pay death benefits and annuities due but unpaid at death under the Railroad Retirement Act. Benefits are paid to designated beneficiaries or to survivors in a priority designated by law.

ADDITIONAL INFORMATION OR COMMENTS:

Copies of the forms and supporting documents can be obtained from Chuck Mierzwa, the agency clearance officer (312-751-3363). Comments regarding the information collection should be addressed to Ronald J. Hodapp, Railroad Retirement Board, 844 North Rush Street, Chicago, Illinois 60611-2092 and the OMB reviewer, Lori Schack (202-395-7316), Office of Management and

APPENDIX C

Phase 1 Radiological Survey Work Plan Forrestal Village Military Housing Site Great Lakes Naval Station

**PHASE 1 RADIOLOGICAL SURVEY
WORK PLAN**

**FORRESTAL VILLAGE MILITARY HOUSING SITE
GREAT LAKES NAVAL STATION**

GREAT LAKES, IL

PREPARED FOR:

**FOREST CITY WASHINGTON
1615 L STREET NW, SUITE 400
WASHINGTON, DC 20036**

CHICAGO, IL 60656

**REVISION 0
NOVEMBER 2005**

PHASE 1 RADIOLOGICAL SURVEY WORK PLAN

**FORRESTAL VILLAGE MILITARY HOUSING SITE
GREAT LAKES NAVAL STATION
Great Lakes, IL**

Prepared for:

Forest City Washington
1615 L Street NW, Suite 400
Washington, DC 20036

Prepared by:



MACTEC Development Corporation
751 Horizon Court, Suite 104
Grand Junction, CO 81506

November 2005

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ACRONYMS

CFR	Code of Federal Regulations
CoC	Chain of Custody
cpm	counts per minute
CRDL	Contract Required Detection Limit
CT	Central Tendency
CV	Coefficient of Variation
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
NaI	Sodium Iodide
NAVSTA	Naval Station
NIST	National Institute for Standards and Technology
NORM	Naturally Occurring Radioactive Material
NRC	U.S. Nuclear Regulatory Commission
pCi/g	pico Curies per gram
QA	Quality Assurance
QC	Quality Control
Ra	radium
RSO	Radiation Safety Officer
RSR	Radiological Scoping Report
PIRS	Phase 1 Radiological Survey
STL	Severn Trent Laboratories
Th	thorium
U	uranium
DOE	U.S. Department of Energy
VSP	Visual Sample Plan

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Phase 1 Radiological Survey (PIRS) Work Plan for the Forrestal Village Military Housing Site (Site) was prepared by MACTEC (MACTEC Development Corporation and MACTEC Engineering and Consulting, Inc.) for Forest City Washington.

Surface and near-surface radiological impacts were identified at the Site during the September 2005 Radiological Scoping Survey. Survey and soil laboratory analysis results revealed thorium-232 (and thorium's progeny) as the significant radioisotope at these locations (MACTEC 2005). Prior to the Radiological Scoping Survey, it was believed that there were no known historical uses of, or operations with radioactivity on the property east of Mississippi Avenue. As a result of these identified impacts at the Site, additional radiological surveys were requested to be conducted to further identify the potential for additional radiological impacts at the Site.

This Phase 1 Radiological Survey is being performed to determine whether additional radiological impacts might be present in surface or near-surface soil layers within the identified Phase 1 survey boundary at the Site and, if identified, to collect soil samples in order to characterize the radioactivity.

1.2 SITE DESCRIPTION

The 282-acre Site is located within the Forrestal Village Military Housing Unit, NAVSTA Great Lakes, Great Lakes, Illinois. The PIRS Work Plan applies to an area of approximately 52 acres extending to the east and south of the areas where radiological impacts were previously detected (Figure 1-1). This survey area is designated as the Phase 1 area.

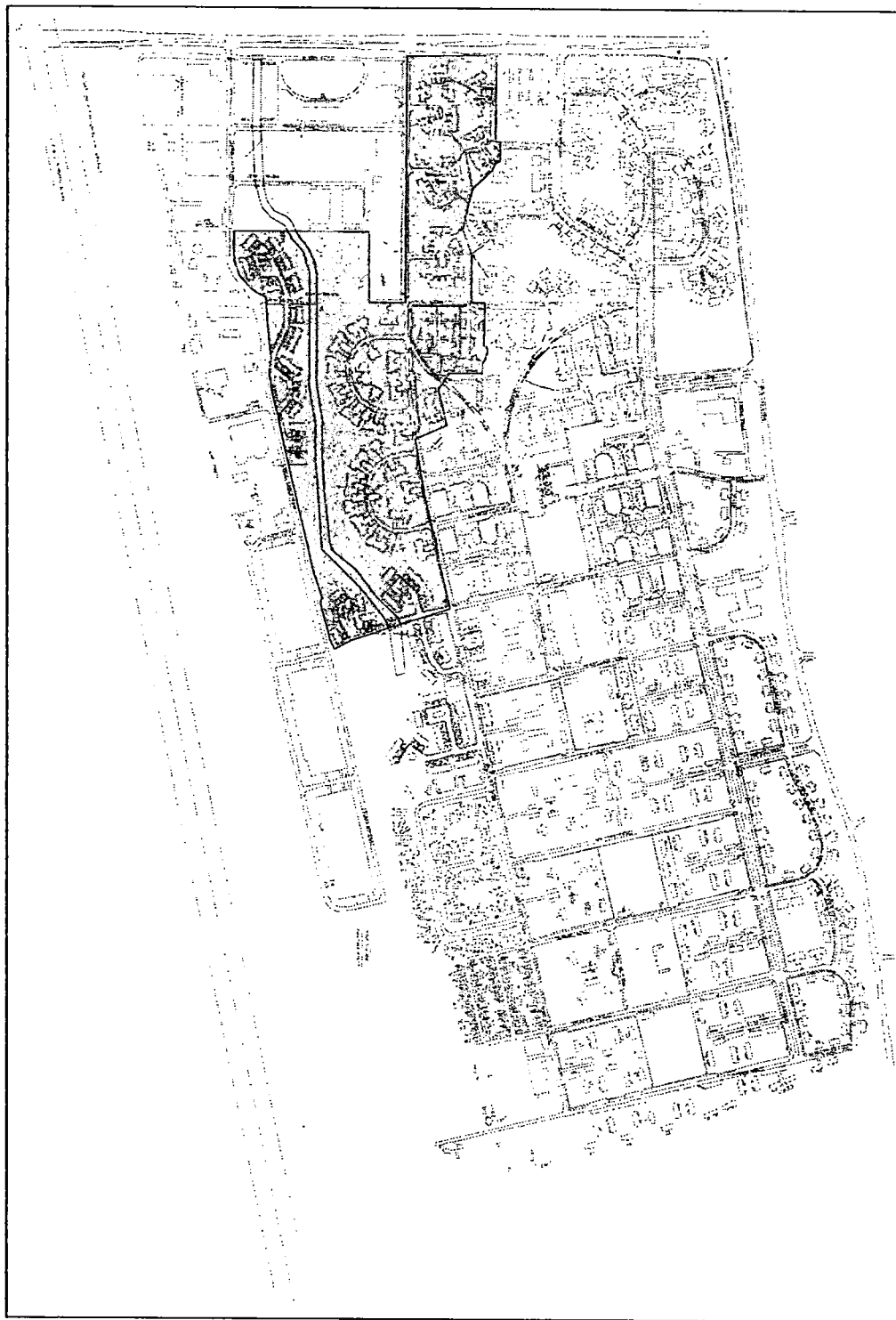


Figure 1-1 Forrestal Village, Phase 1 Survey Area (shaded)

1.3 SCOPE OF WORK FOR THE PHASE 1 RADIOLOGICAL SURVEY

The purpose of this PIRS is to identify radiological impacts in the surface or near-surface soil layers within the Phase 1 survey area at the Site. Residual radioactivity may have been transported and deposited from nearby storage and processing area(s) known to possess radioactive materials. Identified radiological impacts will be characterized for isotopic composition by portable gamma spectrometer to determine whether the isotopic composition is consistent with radioisotopes found in Monazite sands.

The primary objectives of this PIRS are:

- Identify and locate surface and near-surface radiological impacts within the survey area boundary.
- Identify the radioisotopic composition of identified radiological impacts in soil.
- Assess the magnitude and lateral extent (in counts per minute [cpm]) of identified radiological impacts present in surface and near-surface soil.

All radiological surveys will be conducted in accordance with the applicable portions of MACTEC's Radiation Protection Program. Radiological surveys will not be performed in any structures or on the surfaces of paved/concrete streets (if it is determined to be unsafe for survey technicians).

1.3.1 Volumetric Surface Soil Sampling

It is anticipated that volumetric soil sampling will be performed during the execution of this scope of work. Surface soil samples will be collected and submitted for laboratory analysis to confirm isotopic composition and to provide a quantitative measure of the radioactive concentration present.

1.3.2 Surface Soil Walkover Survey

Radiological walkover surveys will be performed in the survey area to identify the presence of residual surface or near-surface radioactivity associated with radioactivity from the nearby storage and processing areas or any other anomalous introduction of radioactivity that may be present in the surface or near-surface soil layer.

The walkover survey will be performed using industry-standard portable radiation monitoring equipment (e.g., sensitive 2-inch by 2-inch sodium iodide [NaI] detector coupled with Eberline's E600 instrument) (Figure 1-2) capable of measuring photon (gamma) emissions associated with thorium and radium progeny. During the walkover surveys, static one-minute counts will be performed and logged at locations where radiological impacts are suspect or encountered.

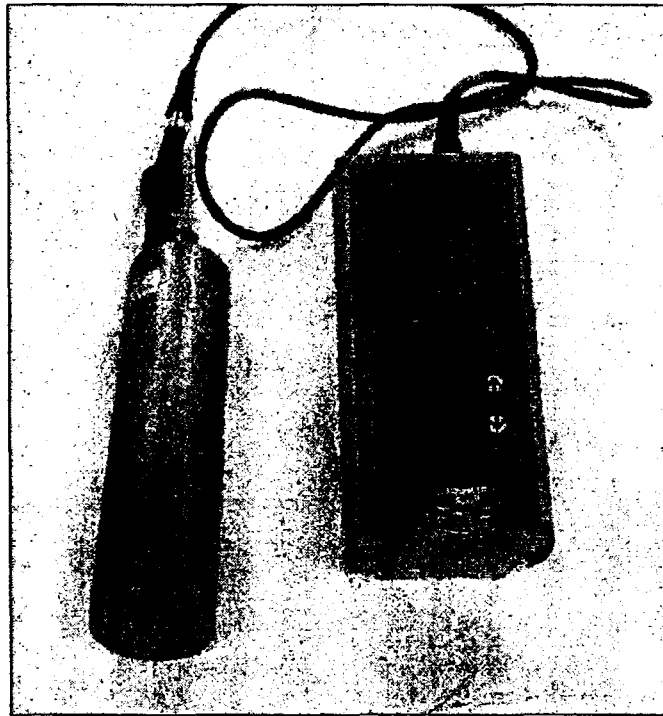


Figure 1-2 Eberline E600 and 2x2 NaI Detector

1.3.3 Storm Water Drainage System Components Survey

Storm water drainage system components will be surveyed for the presence of residual radioactive material. The survey will be performed using portable radiation monitoring equipment, as described above (e.g., the same instrument/detector system used for soil areas).

Survey locations should include street drains, drain bottoms, outfall structural material, and areas accessible for survey without personal entry into any portion of the storm water drain system. Sediments and bottoms beneath water bodies will not be surveyed.

1.4 PROJECT SCHEDULE

Surveys are scheduled to be completed during the week of November 14, 2005. Site personnel have been apprised of this schedule and work plan to be available at the site during survey activities to observe and provide additional assistance, as necessary.

MACTEC will document the results of the surveys in a Phase 1 Radiological Survey Report within approximately 30 days of the completion of survey activities and the receipt/verification of analytical data reports from contract laboratories for soil samples collected.

2.0 RADIOLOGICAL DATA OBJECTIVES

2.1 WALKOVER SCAN SURVEYS

Surface soil walkover surveys will be performed in support of identifying elevated residual radioactivity in the survey area.

2.2 STATIC ONE-MINUTE MEASUREMENTS

Static one-minute measurements will be performed in support of identifying and quantifying elevated residual radioactivity in the survey area.

2.3 GAMMA SPECTROMETER RADIOISOTOPIC COMPOSITION ANALYSIS

Gamma spectrometer radioisotopic composition analysis will be performed in support of identifying isotopic composition in areas of elevated residual radioactivity.

A summary of the survey locations and quantities are listed in the following table (Table 2-1).

Table 2-1 Survey Locations

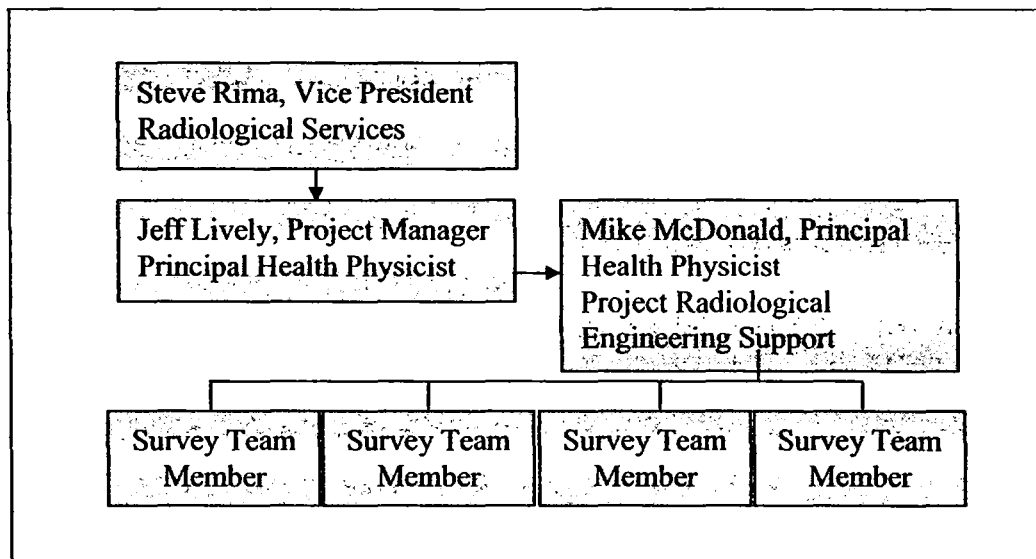
Survey / Sample Type	Description / Location	Number of Samples / Measurements
Volumetric Soil Samples	Volumetric samples, as requested by MEC personnel.	No minimum
Gamma Walkover Survey	Walkover survey in survey area (shaded area on map).	~ 100% total area
Static Measurement	Direct static measurements performed at locations of elevated walkover readings.	No minimum or maximum
Gamma Spectrometer	In-situ analysis performed at locations of elevated walkover/static readings.	No minimum or maximum

3.0 PROJECT ORGANIZATION

3.1 MACTEC ORGANIZATION

The PIRS will be executed by MACTEC personnel located in Grand Junction, Colorado. Figure 3-1 presents the MACTEC project organization and reflects the most current personnel assignments. MACTEC field personnel will be supported by a subcontracted off-site laboratory for quantitative radiological analysis of soil samples, as necessary or requested.

Figure 3-1 MACTEC PIRS Organization Chart



3.2 CONTACT INFORMATION

The contact information is provided for key personnel:

Table 3-1 Organization Contact Information

NAME	LOCATION	CONTACT NUMBERS
Steve Rima	MACTEC Development Corporation Radiological Services Division 751 Horizon Court, Suite 104 Grand Junction, CO 81506	(970) 243-2861 (w) (970) 260-3848 (c) (970) 256-7356 (f)
Jeff Lively	MACTEC Development Corporation Radiological Services Division 751 Horizon Court, Suite 104 Grand Junction, CO 81506	(970) 243-2861 (w) (970) 260-8202 (c) (970) 256-7356 (f)

Mike McDonald	MACTEC Development Corporation Radiological Services Division 751 Horizon Court, Suite 104 Grand Junction, CO 81506	(970) 243-2861 (w) (970) 270-5314 (c) (970) 245-7356 (f)
---------------	--	--

3.3 SUBCONTRACT SERVICES

MACTEC has subcontracted Severn Trent Laboratories (STL) for laboratory services. Analyses for all specified parameters will be performed by STL's St. Louis, Missouri, laboratory facility. The full shipping address of the STL St. Louis laboratory is:

Severn Trent Laboratories, Inc.
13715 Rider Trail North
Earth City, MO 63045
Tel: (314) 298-8566
Fax: (314) 298-8757

The point of contact for STL is Mr. John Powell. Hours of operation are 8 a.m. to 5 p.m., Monday through Friday.

Contractual radioanalysis include:

- Isotopic Thorium by alpha spectroscopy, MDA of 0.5 pCi/g, for volumetric soil and sediment samples.
- Ra-226, U and Th decay series by gamma spectroscopy with 10-day, in-growth period, MDA of 0.5 pCi/g Ra-226, for volumetric soil and sediment samples.
- Ra-226, U and Th decay series by gamma spectroscopy with 21-day, in-growth period, MDA of 0.5 pCi/g Ra-226, for volumetric soil and sediment samples.

3.4 PROJECT TRAINING

MACTEC provides or contracts for continuing training for its Health Physics personnel and other staff who may be exposed to radioactive materials. Training varies according to the potential exposure and the nature of the employee's job duties. In addition to regular training, special training will be provided on equipment, survey techniques, and practices relative to the survey activities for those employees who will be involved in performing radiological measurements and samples. All members of the survey team will attend in-house training, reviewing radiation protection, survey procedures, and quality assurance activities. Documentation of training participation and results of testing to demonstrate knowledge and skills will be retained in the MACTEC corporate training files.

4.0 FIELD PROGRAM PROCEDURES AND REQUIREMENTS

This section presents details of the sampling methods and measurement techniques used in the PIRS.

4.1 MEASUREMENT METHODS—OVERVIEW

This PIRS Work Plan prescribes three basic field activities in order to determine compliance with the sampling objectives. The three basic measurement activities required are:

- Gamma Walkover Measurements—sweeping measurements made over large areas in the survey area to assess the gross photon emission from surface and near-surface residual radioactivity.
- Direct Static Field Measurements of Surfaces—timed static measurements at locations where elevated walkover measurement readings are identified, to assess the gross gamma emission at those locations in real-time.
- Gamma Spectrometer Analysis—analysis of isotopic composition by portable gamma spectrometer to determine whether or not the isotopic composition is consistent with nominal background radioisotopes for the area, is a result of the introduction of thorium-enriched Monazite sands from the processing and holding areas (across Mississippi Street), or is a result of other anomalous radioisotopes in the soils/sediments.
- Soil sampling.

The following supporting procedures are available and required to conduct the survey and sampling activities of the project:

- RPO-201, *Operation of Portable Survey Instruments*
- RPO-202, *Operation of The Eberline E-600*
- RPO-210, *Operation of The Exploranium GR-130 MiniSpec*
- RPO-301, *Radiological Surveys*

4.2 FIELD SURVEY INSTRUMENTATION

4.2.1 Walkover Survey Instrumentation

The principal field measurement method will be direct assessment of surface activity using a NaI detector. Timed static measurements will be made at locations where walkover scans indicate the presence of radioactivity in excess of naturally occurring background concentrations.

Table 4-1 Field Measurement Instruments for Surfaces

Element	Description
Instrument	Eberline E-600 Multipurpose Radiation Survey Instrument
Probe	Eberline SPA-3
Procedure	Procedure RPO-202

Notes: 1. Instrument and probe selection is subject to revision (with an equivalent instrument).

The instrument type/technology is recommended for this type of measurement and is commonly used for measuring surface deposited radioactivity levels from thorium and radium series sources of radioactivity. It is reliable, readily available, and reasonably easy to use by trained personnel. The technique is widely used in health physics and is a standard radiation protection practice for assessing radioactive surface contamination and for making risk management decisions.

4.2.2 Portable Gamma Spectrometer Instrument

At locations where elevated readings are observed during walkover surveys and verified as elevated by static one-minute measurements, the isotopic composition will be assessed using the portable gamma spectrometer.

Table 4-2 Gamma Spectrometer Instruments for Analysis

Element	Description
Instrument	Exploranium GR-130 miniSPEC
Probe	Internal
Procedure	Procedure RPO-210

The instrument type/technology is recommended for this type of analysis and is commonly used for radionuclide identification of gamma-emitting radioactivity, including those from the thorium and radium series and their progeny. It is reliable, readily available, and reasonably easy to use by trained personnel.

4.3 INSTRUMENT RESPONSE CHECK

At the beginning and end of each day, survey instrumentation will be response checked with a radioactive check source to ensure it is working properly (Figure 4-1). Instruments that do not "pass" daily response checks will be removed from service and repaired prior to placement back in service. Instrument response checks will be performed in accordance with the applicable MACTEC Radiation Protection Operating (RPO) procedure.



Figure 4-1 Instrument Response Check

4.4 WALKOVER SURVEY PLAN

4.4.1 Walkover Survey

The walkover survey will be performed by teams of survey personnel using radiation detection instrumentation, described in Section 4.2.1. The walkover survey is performed by walking over a designated survey area at a nominal rate (approximately 1 mile per hour) with the instrument detector approximately 1 to 2 inches above the ground surface. The detector is moved in a side-to-side motion in front of the surveyor as the surveyor progresses forward (Figure 4-2).



Figure 4-2 Walkover Survey Technique

The survey team will walk along an imaginary row within the designated survey area, turning around at the end of the row and walking back on the adjacent row (Figure 4-3). When an audible or meter response indicates count rates at greater than established background levels, the surveyor shall stop and attempt to identify the precise location of the anomaly creating the greater than background indication. Once located, the spot will be physically marked, recorded on the survey map, and a one-minute static count performed and recorded. Further investigation of the identified radiological impact will be performed, as needed, in an attempt to determine the areal extent of the impacted area.

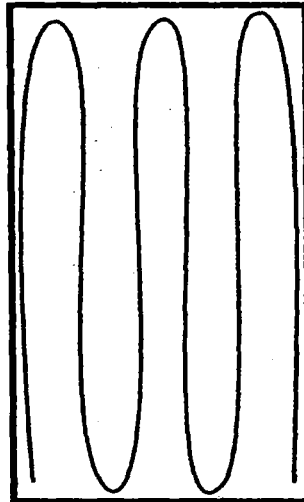


Figure 4-3 Survey Area Walkover Track Example

5.0 MEASUREMENT SENSITIVITY AND QUALITY CONTROL

5.1 MEASUREMENT SENSITIVITY

Measurement sensitivity is an important component of the surveying plan because it is critical that measurement systems be capable of detecting the benchmarks that guide decisions. In this case, specific benchmarks for decisions are not specified. However, it is still important to understand and disclose the measurement capability of the systems used. This section discusses measurement system sensitivity.

5.1.1 Field Instrument for Direct Static Measurement of Soil Surfaces

The direct measurement field instrumentation, specified in Table 4-1, is a reliable device with adequate detection sensitivity and is suitable for timed static field measurements. The following formulation is used to predict the minimum detectable concentration (MDC), in cpm, for the E-600 survey instrument using the Eberline SPA-3 (NaI) detector probe.

$$MDC = 3 + 4.65\sqrt{C_b} \quad (1)$$

Where: MDC = the minimum counts above background radioactivity (in cpm) that can be measured with 95% confidence.

C_b = the total number of background counts over the sample count period (T).

Using conservative estimates of the parameters affecting the MDC of the static field measurement, an *a priori* assessment of the MDC can be determined. This value represents the worst plausible case measurement conditions and yields the highest expected measure of the detection sensitivity for the analysis. As such, the *a priori* estimate of the MDC serves as a figure of merit about the capability of the measurement. Table 5-1 and the following calculation define the *a priori* MDC estimates for the static surface radioactivity measurements using the E-600 and the SPA-3 detector probe identified.

Table 5-1 Static Surface Radioactivity Measurement

Parameter		Value Used	Remarks
C_b	Background counts	6,000	Value used is the product of the maximum expected background count rate (6,000 cpm) and sample count time (one minute).
T_s	Sample count time (in minutes)	1.0	Count time programmed into the calibrated instrument specifically for this sampling event.

These values predict a worst plausible case MDC for the static field measurement to be 364 cpm (in excess of background), as shown in the following calculation.

$$MDC_{net} = 3 + 4.65\sqrt{6000} = 364 \text{ cpm}$$

(2)

$$MDC_{gross} = 6,364 \text{ cpm}$$

5.1.2 Field Instrument for Walkover Measurement of Surfaces

The instrumentation specified in Table 5-2 is a reliable device with adequate detection sensitivity and is suitable for walkover measurements. The following formulation is used to predict the minimum detectable concentration (MDC), in cpm, for the E-600 survey instrument using the Eberline SPA-3 (NaI) detector probe operated in the rate meter mode.

The first step in determining the MDC_{scan} is to calculate the minimum detectable count rate for the surveyor ($MDCR_{surveyor}$). $MDCR_{surveyor}$ is a function of the background count rate, the length of the counting interval, surveyor efficiency, and the index of sensitivity (statistical) as shown in Equation 3. Background for a 2-inch x 2-inch NaI detector is estimated to be approximately 6,000 cpm, and the index of sensitivity (d') will be based upon a 95% true positive rate and a rate of 10% false positive, which yields a value of 2.92. The surveyor efficiency has a value of 0.5, and the length of the counting interval will be 1 second. The results of this evaluation indicate that 1,171 cpm above background (7,171 cpm with background) is the minimum value for 95% true positive detection.

$$MDCR_{surveyor} = \frac{d' * \sqrt{b_i} * (60/i)}{\sqrt{p}} \quad (3)$$

$MDCR_{surveyor}$...surveyor minimum detectable count rate (above background)

d' the index of sensitivity (the number of standard deviations between the means of background and radioactivity above background).

b_i the number of background counts in the counting interval, i .

i the length of the counting interval in seconds.

p surveyor efficiency.

Table 5-2 $MDCR_{surveyor}$ Values

Parameter		Value
i	The length of the counting interval (seconds)	1
d'	Index of sensitivity	2.92
C_b	Background count rate (cpm)	6,000
b_i	Number of background counts in counting interval i	100
s_i	Minimum detectable net counts in counting interval i	29.2
MDCR	Minimum detectable count rate (cpm)	1752

p	Surveyor efficiency	0.5
$MDCR_{surveyor}$	Surveyor minimum detectable count rate (cpm)	2478

$$MDCR_{surveyor} = 6000 + 2478 \cong 8500 \text{ cpm}$$

5.1.3 Laboratory Sensitivity for Surface Soil Samples

MACTEC specified by contract with the off-site laboratory that the gamma spectroscopy and isotopic thorium by alpha spectroscopy analyses achieve minimum detection limits of at least 0.5 pCi/g for each major gamma line in the U-238 and Th-232 series and at least 0.5 pCi/g for each thorium isotope (Th-230, -232, -228) assayed by alpha spectroscopy.

5.2 QUALITY CONTROL MEASUREMENTS

5.2.1 Quality Control Data for Surface Soil Samples

To assure quality in sampling and analytical processes that may be performed, MACTEC has specified to the laboratory that a full Quality Assurance (QA) package be included with the sample analysis. This includes verification of instrument calibration and laboratory sample batch quality control (QC) measurements (e.g., duplicate measurements, blanks, and matrix spikes).

5.3 SAMPLE CHAIN OF CUSTODY, PACKAGING, AND TRANSPORTATION

Sample control will be maintained during the course of field activities and laboratory processing. To assure that adequate control is maintained, samples will be subject to industry standard "chain-of-custody" (CoC) control procedures. The objective of the CoC process is to assure the quality of the data by ensuring that samples from which data is drawn are appropriately labeled and controlled. CoC forms will be provided, as necessary, by the analytical laboratory for this PIRS project.

6.0 LABORATORY ANALYTICAL PROCEDURES

6.1 GAMMA SPECTROSCOPY

Soil samples will be analyzed by gamma spectroscopy for isotopes of the uranium series, including radium and radium progeny, the thorium series (Th-232 and its progeny), and Ra-226. The required detection level (2-sigma) will be 0.5 pCi/g for Ra-226.

6.2 ALPHA SPECTROSCOPY

Soil samples collected during this program will be analyzed for Th-228, Th-230, and Th-232 by alpha spectroscopy. The required detection level (2 sigma) will be 0.5 pCi/g for each isotope.

6.3 QA CORRECTIVE ACTION

The analytical laboratory will provide MACTEC with data generated only when the analytical system was determined to be in control. Corrective action for out-of-control situations will be performed in accordance with the following procedure:

- Out-of-control situations in the laboratory are investigated by the analyst and the QA manager to determine the cause and decide on the appropriate corrective action. Out-of-control situations may involve either a single data point or trend established by several data points. The details of the situation and the corrective action taken are fully documented in a corrective action report submitted to MACTEC. Affected field sample data are evaluated and reanalyzed, as necessary. When a method is determined to be out-of-control, the analysis of field samples is suspended. Corrective action must be documented, and the method must be demonstrated to be in control before analysis of field samples may resume. Analytical control is demonstrated by acceptable analysis of QC samples.

6.4 DATA MANAGEMENT

MACTEC will reduce and review data collected during the field investigation and report the findings in a standard format.

6.4.1 Data Reduction

Data reduction at the laboratory is the process of converting measurement system outputs to an expression of the parameter that is consistent with the comparability objective. Calculations made during data reduction are described in the referenced analytical methods and in the participating laboratories' QA program documents. Data may be further reduced and compiled,

as required, in order to evaluate the data set as a subset or as a whole and to draw conclusions needed to support the data quality objectives.

6.4.2 Data Review and Validation

All analytical data generated during the field investigation will be reviewed by MACTEC technical staff. The analytical laboratory will review data to ensure QC criteria were met. If criteria are not met, the sample will be reanalyzed within specified holding times.

7.0 REFERENCES

- MACTEC 2005 MACTEC Development Corporation, 2005. *Final Radiological Assessment Survey Report In Support of the Phase II Environmental Site Assessment*, NAVSTA Great Lakes Naval Region Midwest Family Housing Privatization, Grand Junction, CO, October 2005.
- NRC 1997b U.S. Nuclear Regulatory Commission, 1997. *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*, NUREG 1507, Office of Nuclear Regulatory Research, Washington, DC.
- NRC 2000 U.S. Nuclear Regulatory Commission, 2000b. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Revision 1*, NUREG-1575, Rev. 1, Office of Nuclear Regulatory Research, Washington, DC, August 2000.

APPENDIX D

Volumetric Sample Chain-of-Custody Forms

Attachment 1
Form RPO-605-0-1



MACTEC, Inc.

751 Horizon Court
Suite 104
Grand Junction, CO
81506

CHAIN OF CUSTODY FORM

Page 1 of 1

Agreed Turnaround Time

☐ 24 hour ☐ 72 hour ☐ 5 Day
☐ 10 Day ☐ 3 Week ☐ Other

Lab Batch No.

Lab ID:

Seals Intact?

☐ Yes ☐ No ☐ NA

Shipping Container Damage?

☐ Yes ☐ No ☐ NA

PROJECT INFO

MACTEC Contact

Jeff Lively

Project No.

9120051154

Project Title/No.

Forneston Village

Purchase Order No.

N/A

Address

Forneston Village

City/State/Zip

Great Lakes NTS IL

LABORATORY INFO

Laboratory Name

Severn Trent Labs

Phone

314 298 8646

Laboratory Contact

John Powell

Fax

314 298 8757

Address

13715 Rider Trail North

City/State/Zip

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INVOICE (if other than MACTEC contact)

Company Name

Phone

Company Contact

Fax

Address

City/State/Zip

Special Handling Instructions

Lab Sample No.	Date/Time Collected	Sample ID	Sample Type ¹	Sample Media ²	(Composite) (Grab)	Sample Volume	Sample Location/Depth/Fraction/Etc. (describe if necessary)	Requested Analysis	Alpha Spec	Gamma Spec	Gamma Spec	Call						
	11/14/05 0815	HS01-01	RS	VOL	G	~500 ml			✓	✓	✓							
	11/12/05 0840	HS01-03	RS	VOL	G	~500 ml			✓	✓	✓							
	11/12/05 0815	RO1-01	RS	OTH			Slag sample (rock)					✓						
	11/12/05 1012	HS02-04	RS	VOL	G	~500 ml			✓	✓	✓							
	11/12/05 1012	RO2-04	RS	OTH			Slag sample (rock)					✓						
	11/12/05 1145	HS03-01	RS	VOL	G	~500 ml			✓	✓	✓							
	11/12/05 0948	HS02-18	RS	VOL	G	~500 ml			✓	✓	✓							
	11/18/05 1530	GL01-01	RS	VOL	G	~500 ml			✓	✓	✓							
	11/13/05 1003	HS15-01	RS	VOL	G	~500 ml			✓	✓	✓							

¹Type

BIO - In-Vitro
RS - Rad
EN - Environ.
MIX - Rad + Chem
HAZ - Hazardous
OTH - Other (describe)

²Sample Media

VOL - Volumetric
AF - Air Filter
WIPE - Smear
LIQ - Liquid
OTH - Other (describe)

³Analysis Requested

ALPHA - Alpha Spec.
GROSS - Gross beta/gamma
GAMMA - Gamma Spec.
LSC - Liquid Scintillation
OTH - Other (describe)

Relinquished by:

Date/Time

Received by:

Date/Time

Relinquished by:

Date/Time

Received by:

Date/Time

11-14-05

1349

Relinquished by:

Date/Time

Received by:

Date/Time

Relinquished by:

Date/Time

Received by:

Date/Time

WHITE: Laboratory Copy

YELLOW: Report Copy

PINK: MACTEC Copy

Attachment 1
Form RPO-605-0-1